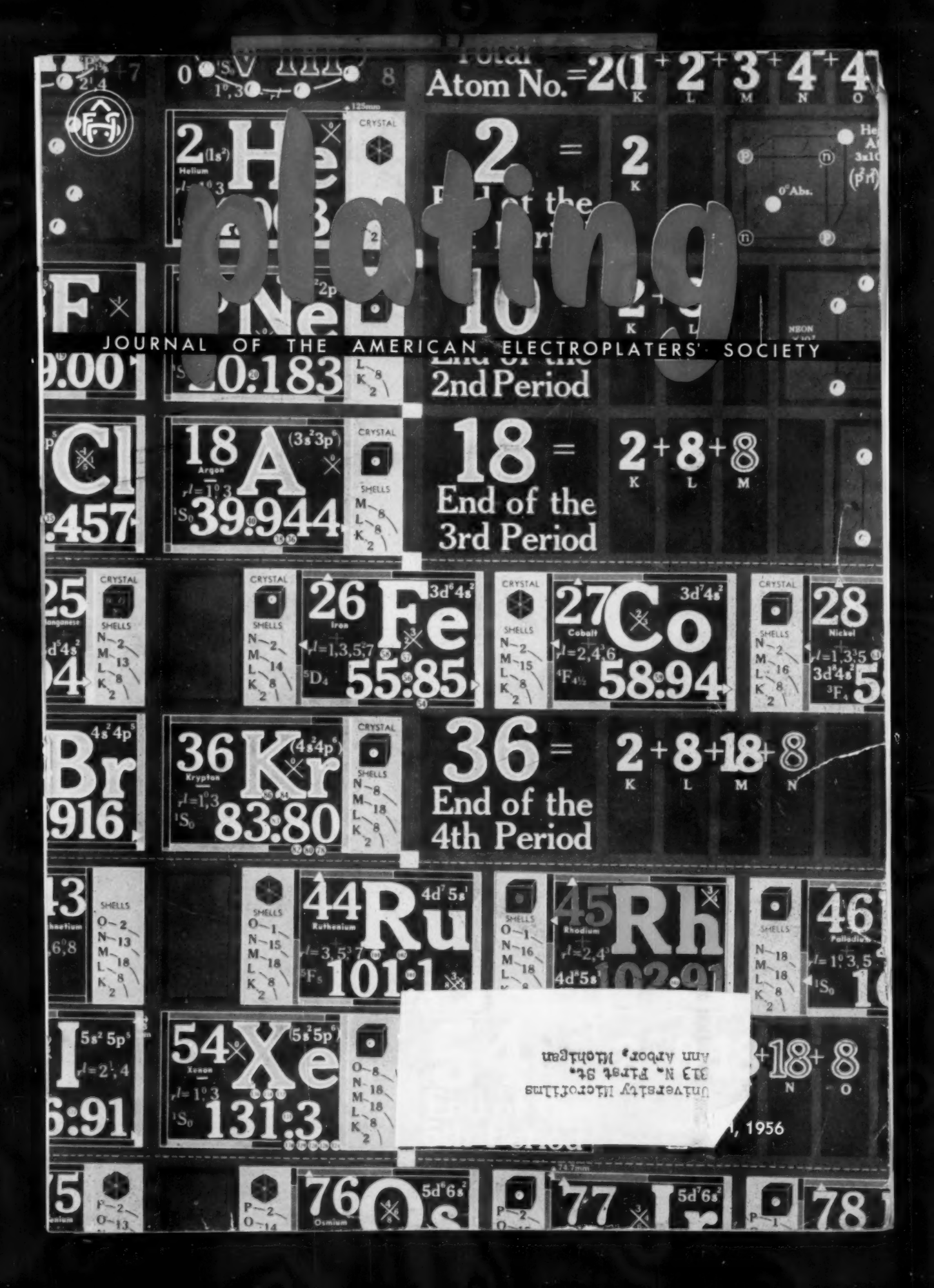

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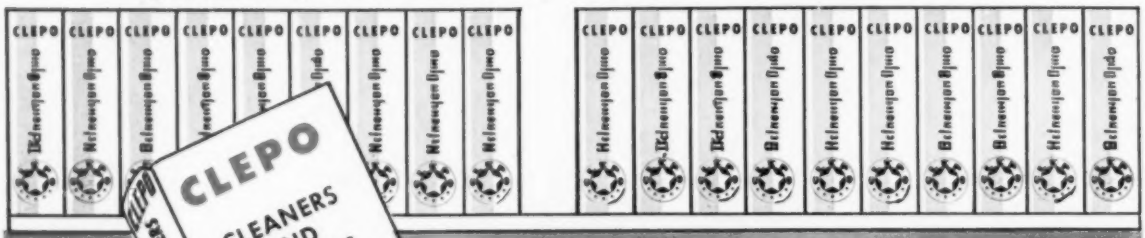

PRE-PAINT CLEANERS
PHOSPHATE CLEANERS FOR STEEL
SPRAY BOOTH CLEANERS
STRIPPERS

CLEPO
METAL FINISHING CLEANERS AND PROCESSES

Technical Skill Formulated These Compounds for Use in Organic Finishing

1. to produce chemicals that will do the work fast and thoroughly and without damage to the metal surface.

2. to assure that this work, some of it non-productive, can be done economically.

At the left are listed two objectives that always concern our technical staff when it is working on cleaner and stripper formulations.

On strippers, in particular, we keep well in mind that an appreciable cost has already gone into the work. Reclamation just can't carry a high cost. Nor should it damage the work.

CLEPO Products meet these severe requirements.

We could list several CLEPO Formulations that will do an excellent cleaning or stripping job but it wouldn't begin to cover our line. Why not tell us about your requirements and then have our field service man call and outline the best chemicals and procedure? We are confident that with you it will be 'once CLEPO always CLEPO'. . because you will get good results fast and at low cost.

FREDERICK GUMM *Chemical Company Inc.*

538 FOREST STREET, KEARNY, N. J.

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RUST REMOVERS

RUST PROOFING COMPOUNDS

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Since 1930, ENTHONE Incorporated has developed and brought to the metal finishing market many specialty products and processes. Often these products have provided the answers to finishing problems previously unsolved. ENTHONE ENSTRIPS, for example, are patented products for the selective dissolving of one metal plated on another without attacking the base metal.

ENSTRIP A — U.S. Patent No. 2,649,361 — was the first product ever offered for dissolving nickel plate without attack on the steel basis metal.

ENSTRIP 165-S — U.S. Patent No. 2,698,781 — was the first product ever offered for dissolving nickel from copper base alloys without attack on the basis metal. And there are many other selective strippers in the ENSTRIPS group to meet all requirements.

If you have a metal finishing problem, ask ENTHONE *first!* Write now for the folder "They are HERE . . ." describing **20** ENTHONE answers to difficult finishing problems.

ENTHONE INCORPORATED

442 ELM STREET, NEW HAVEN 11, CONNECTICUT

Metal Finishing Processes • Electroplating Chemicals

ALUMINUM FINISHES

THE FINISHING TOUCH

by A. B. HOEFER
vice president
FREDERIC B. STEVENS, INC.

Will Anodized Aluminum Replace Nickel-Chrome Finishes?

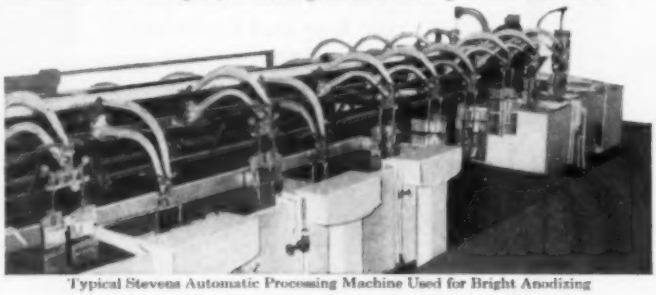
Affirmative answers to this question are revealed in several current business publications and our own sales figures.

Speeding the change is the continued tight supply of nickel. Manufacturers have been forced to look for substitutes for nickel and like the results anodized aluminum have given them.

A trend is developing. Volume of Stevens Automatic anodizing equipment sold in 1955 was nearly double the volume for the two preceding years. At the same time, sales of Stevens compositions used in buffing and polishing aluminum were showing a 50% increase.

Frederic B. Stevens, Inc., manufacture equipment for both nickel-chrome and aluminum finishes. We believe both types of finishes will increase in demand but at the moment the interest in aluminum is high.

If you are considering aluminum for your product, you can be assured that aluminum parts can be bright anodized and finished to compare favorably with the fine finish of chrome plate. In addition, aluminum can be dyed, resulting in non-fading colored finishes.



Typical Stevens Automatic Processing Machine Used for Bright Anodizing

Stevens aluminum anodizing equipment is presently being used and recommended in the finishing of colored anodized tumblers, utensils, refrigerator components, rivets, automotive trim, lighting reflectors, etc.

Stevens' experience in furnishing complete anodizing equipment installations assures you of the latest techniques—the finest finishes—at the lowest costs.

For long range planning consider the versatility of Stevens Automatic equipment. Changes of cycles or processes can be accomplished quickly and inexpensively. Your Stevens Automatic Processing Machine for anodizing can be changed to a nickel-chrome cycle at a later date.

If your design engineers are talking of aluminum to add sales appeal excitement, cost reducing features to your new product lines, let us discuss your requirements with you.

For further information write to Frederic B. Stevens, Inc., Detroit 16, Michigan.

FREDERIC B. STEVENS
INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

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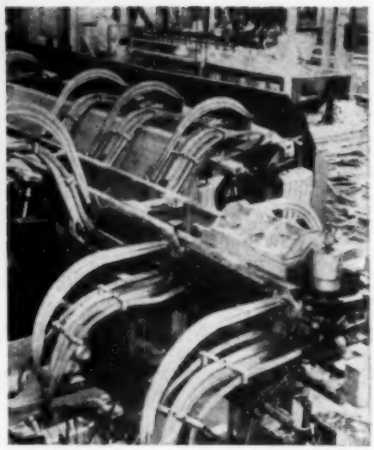
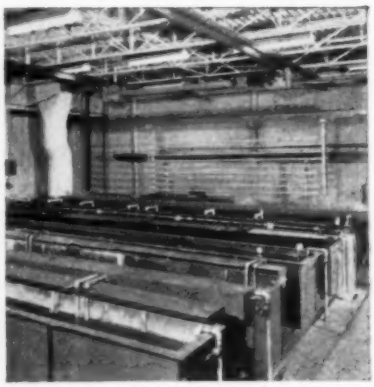
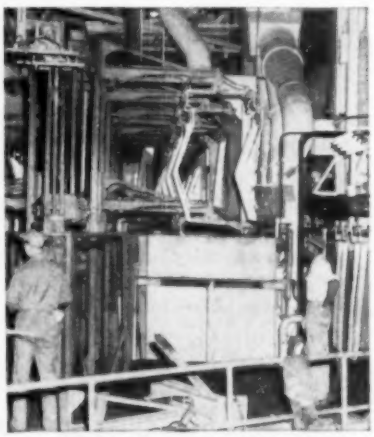


Stevens Model "B" Automatic Processing Equipment used in anodizing refrigerator evaporators.



Stevens Still Tank installation for anodizing extruded architectural and aircraft parts.



Automatic "Stevadoer" used in anodizing grille sections for leading automotive manufacturer.

An Educational Society for the Advancement of the Science of Electroplating, the Finishing of Metals and Allied Arts

plating

Journal of the American Electroplaters' Society

March 1956 **Vol. 43, No. 3**

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111 N. LaCienega Blvd., Beverly Hills, Calif., CRestview 5-2022

William Ayres
Lee F. O'Connell Co.
233 Sansome St., San Francisco 4, Calif. YUkon 6-2981
Western Advertising Representatives

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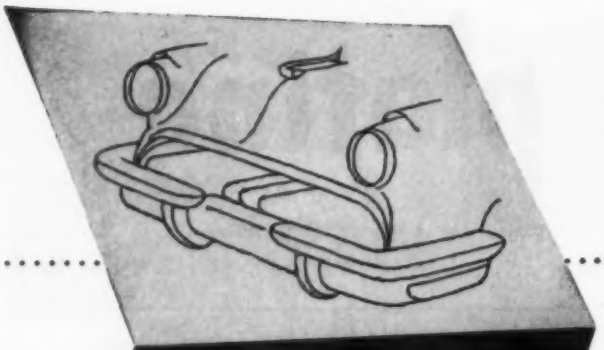
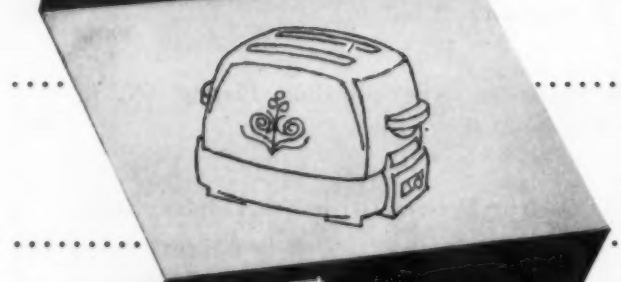
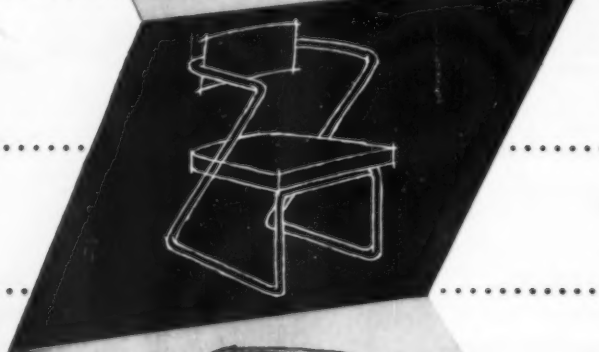
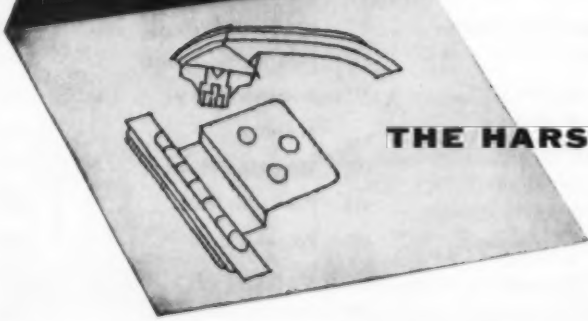


HARSHAW electroplating CHEMICALS and ANODES







nickel plating

... still and barrel ... nickel anodes—all commercial grades and sizes .. anode bags ... single nickel salts—nickel chloride ... nickel carbonate ... nickel fluoborate ... boric acid.

chromium plating

.. pure "Krome Flake" 99.8% CrO_3 ... sulphates less than .10% ... lead, tin-lead and antimony-lead anodes.

copper plating

... copper ball anodes ... Rochelle Salts ... sodium and copper cyanides ... copper sulfate ... copper fluoborate.

cadmium plating

... ball and cast cadmium anodes ... cadmium oxide ... sodium cyanide ... cadmium fluoborate.

tin plating

... cast tin anodes ... sodium stannate ... stannous sulfate ... tin fluoborate ... acid tin addition agent.

zinc plating

... ball and cast zinc anodes ... sodium and zinc cyanide ... zinc sulfate ... zinc fluoborate.

lead plating

... cast lead anodes ... lead fluoborate.

silver plating

... silver cyanide.

THE HARSHAW CHEMICAL COMPANY

Cleveland 6, Ohio

Chicago 10, Ill. • Cincinnati 13, Ohio • Detroit 28, Mich.
Houston 11, Texas • Los Angeles 22, Calif. • Philadelphia 48, Pa.
Pittsburgh 22, Pa. • New York 17, N. Y.

EDITORIAL

"A Candle Never Loses Anything . . .

It was a wise, anonymous sage who first stated that a candle never loses anything by lighting another candle. In fact, a precursory consideration of this exchange will bear out the fact that both candles gained because the one loaned its fire to the other. Carrying the matter a little further, it is obvious even to the unthinking that one candle alone is an ineffective source of light; but 10, 30, 100 or 1000 candles amassed together give a formidable brilliance.

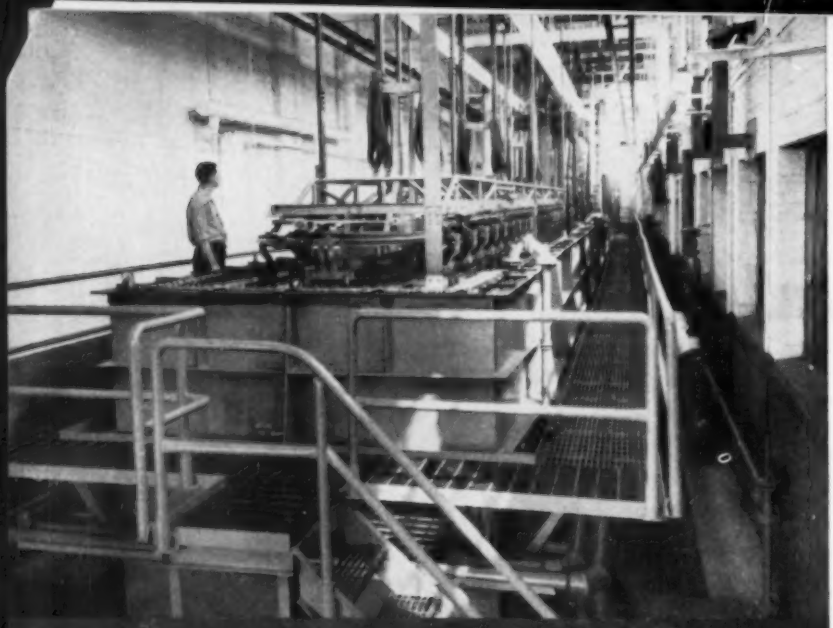
Is this same principle not applicable to man? One man alone can be no more effective than the limits of his strength, his intellect and his life. If this one man infects another with his ideas and still another, and each one of them does the same, in short order tremendous strength becomes characteristic of the whole group. Each individual has gained.

The same applies to AES membership. If every member of the AES were to enroll one new member, in a short time the whole organization would grow much larger. A larger AES could extend greater services to the industries it represents, to the individuals, to the branches. So let us all pitch in for a bigger, better AES by signing up those new members today.

"A candle never loses anything by lighting another candle."

Francis T. Eddy

2nd Vice President
American Electroplaters' Society



MAINTAINING THE PACE OF MASS PRODUCTION

This Udylite Machine Cleans, Plates and Processes 480 Auto Grilles per hour AUTOMATICALLY

A complete production operation—applying nickel-chrome plate to steel radiator grilles—is handled by three men and this Udylite machine. The entire operation of cleaning, plating and rack strip are handled by the machine—the loading and unloading of parts are the only manual operations. The stampings are approximately 8" x 36" in size and to assure them of a flawless finish Udylite installed a Horizontal Cathode Agitator. In addition, a high current density chrome strike is applied before the chrome plate.

This is just one more example of how Udylite machines are meeting the pace of mass production. And Udylite machines are adaptable to practically any metal finishing operation you can name. Why don't you find out more about how Udylite can fit into your operations? Just call your nearby Udylite representative or write direct for the full details. There's no obligation.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

(Advertisement)

CONTROL OF CHROMIC ACID MIST

Zero-Mist, the new surface-active additive for chromium plating solution control has been given enthusiastic approval by chromium platers. This new product has not only shown dollar savings to platers but has greatly improved health conditions in the plating room.

Udylite Zero-Mist is a completely stable, surface-active additive for decorative chromium plating baths which eliminates the usually troublesome mist and spray. When Zero-Mist is added, a thin curtain of foam forms at the surface of the solution which contains the mist and spray which are evident when Zero-Mist is not used.

While Udylite does not recommend elimination of proper ventilation in any chromium plating operation, there are reports of many platers using Zero-Mist successfully without washing the exhausted air. Zero-Mist has also proved to be of great benefit in plating rooms where wide tanks are difficult to ventilate, or where tanks of normal width are located near windows or doors, since it prevents the blowing of mist and spray due to the cross-currents of air.

From the dollar standpoint, Zero-Mist has shown remarkable savings to platers. Losses of chromic acid from mist and spray in the solution can amount to as much as 40 per cent. When dragout losses are also included, tests have shown Zero-Mist to cut chromic acid waste up to 70 per cent.

Temperatures of the chromium plating solutions have no deteriorating effect upon Zero-Mist. Additions are only required to replace the minor losses from dragout. Boiling concentrated chromic solutions do not break down or destroy its effectiveness, neither do the highest anode or cathode current densities. It is easy to maintain—very simple to control.

Zero-Mist acts by lowering the surface tension of a chromium plating solution. Because of this action, the solution runs off of the work rapidly when it is withdrawn from the tank and only a thin film remains. This minimizes losses up to 50 per cent. By reducing dragout losses, disposal problems are decreased greatly and rinse contamination and rinsing requirements are not as large.

The concentration of Zero-Mist for the complete suppression of mist and spray varies with the bath temperatures, especially its surface temperature. With lower temperatures, lower concentrations of Zero-Mist can be used. Temperatures of about 105° F are most economical for initial make-up. Maintenance additions of Zero-Mist vary only with the amount of dragout. Two to four times per month is normal. With no dragout, concentration of Zero-Mist stays practically constant.

INDICATE A 304.

(Advertisement)

A STANDARDIZED MACHINE FOR PLATING

To meet the increasing demands for higher plating production and at the same time offer a plating and processing machine at lowest possible initial cost, The Udylite Corporation recently announced its new Cyclemaster. Udylite engineers say this new, completely automatic plating machine offers the greatest production of any machine built with comparable floor size.

The essential reason for its low initial cost is standardization. All Cyclemaster models have the same overall length, width and height. The only changes made are in the lengths of the various process tanks. These are changed to accommodate the desired cycles of plating, or processing and the rack size selected.

Each machine is 11 feet, 6 inches in length, of sufficient size to be ideal for cadmium and zinc plating and for copper-nickel-chrome too, where the cycle will fit into its standard length. A survey of the plating industry by the Udylite Corporation brought out that a machine of these specifications would meet the requirements of over 50% of the plating work in shops throughout the country.

The new Udylite Cyclemaster is a fully automatic machine. Its operation is so simple that any regular shop man can keep it operating at full capacity. One man can handle both loading and unloading of the plated parts.

An important feature of this new machine is a new standard multi-purpose carrier. It can be used for double spline or single spline racks. Made of special alloy metal, it has high structural strength and highest conductivity. The new carrier can also be easily adapted to inside anode plating if desired. With this carrier design the current travels only six inches from the cathode rail to the rack.

The Cyclemaster design follows many basic features incorporated in all Udylite machines, and so widely accepted by the industry. Some of these features are: Rack spacings can be varied in individual tanks; machine is operated by hydraulic mechanism permitting variable speeds for lift, lowering or horizontal movement of racks in and out of solution; horizontal transfer of the work carriers is accomplished by a simple tee member pusher mechanism operated hydraulically; tanks which are ventilated, have shields over them which reduces the amount of air exhausted to the outdoors. This cuts down fuel consumption.

Also, like other Udylite Fully Automatic machines the Cyclemaster is completely assembled at the factory and run in before being shipped to the customer as a complete unit. This is easily accomplished as all machines are built on a rugged 4 inch I-beam base. If necessary, it can be shipped in two sections, which require only the bolting of the two sections together to put into operation.

25 MILLION POUNDS ON THE MOVE

Everything from Anodes to Zinc Salts at the Eighteen Udylite Stock Points . . .

Through the new Udylite warehouse in Detroit and through the other seventeen stock point warehouses, located strategically throughout the United States, supplies constantly move to electroplaters all over the world to the tune of over 2 million pounds a month.

These "close at hand" warehouses mean savings to you on freight—they provide for faster deliveries.

And every item has had to meet the exacting chemical and metallurgical tests of Udylite Laboratories.

These eighteen Udylite warehouses have been established to meet your requirements. More are to come as the need develops.

Wherever you are, whatever you need, whenever you want electroplating supplies, Udylite is your best bet.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

INDUSTRY NEWS

Industrial Filter & Pump Expands Again
Management of Industrial Filter & Pump and Contractor participate in ground breaking ceremony. A new $500,000 plant will rise at this site

Light Amplifier Opens New Science and Industrial Fields—A new development that amplifies light electronically thousands of times will be produced commercially by Bendix Aviation Corporation.

Speaking at a demonstration for the press at the Hotel Roosevelt in New York, LeRoy D. Kiley, general manager of the Friez Instrument division of Bendix, said the light amplifier will have an important impact on many processes which are basic to science and industry.

Called the Lumicon, the new device amplifies light 40,000 to 50,000 times. It will reveal a blacked-out scene as a bright television picture. Linked with X-ray, it projects a bright "alive" image on a television screen but works with only low-level X-ray energy.

"The commercial development of this major scientific break-through is an indication of the scope of the Corporation's $82 million-a-year engineering program. This program includes the development of promising work that originates outside our own engineering group," Kiley said.

Patent rights for the new development were acquired by the Corporation from co-inventors Ralph E. Sturm, formerly Radiology department physicist at Johns Hopkins Hospital, Baltimore, and Dr. Russell H. Morgan, chief radiologist at the world-renowned institution. Sturm, who was section chief for electronics at the Friez division of Bendix in Baltimore from 1945 to 1948, rejoined the Friez engineering staff in 1955 to head a new department for commercial development of the light amplifier and other instruments.

In 1950, Sturm and Dr. Morgan received the Gold Medal Award of the American Roentgen Ray Society for low X-ray level motion pictures of the human anatomy.

Pointing out that the amplification of light has been a goal of scientists and physicists for many years, Kiley said the Lumicon provides for the first time an electronic device more sensitive to light than the human eye.

Industrial Filter and Pump Expands Again—The rapid expansion of the chemical processing industry has created a big market for equipment suppliers—but constantly changing techniques and increased specialization make it a field where the supplier has to move fast to keep up. Typical of the fast upswing is Industrial Filter and Pump Manufacturing Company, Chicago, a 30 year old specialist in plating equipment. In 1951 they started a serious push for chemical equipment business with filters, heat exchangers, pumps, waste treatment equipment. With inventive engineering and aggressive sales, they increased their plant size 50 per cent in 1953, and in December broke ground for another $500,000 expansion.

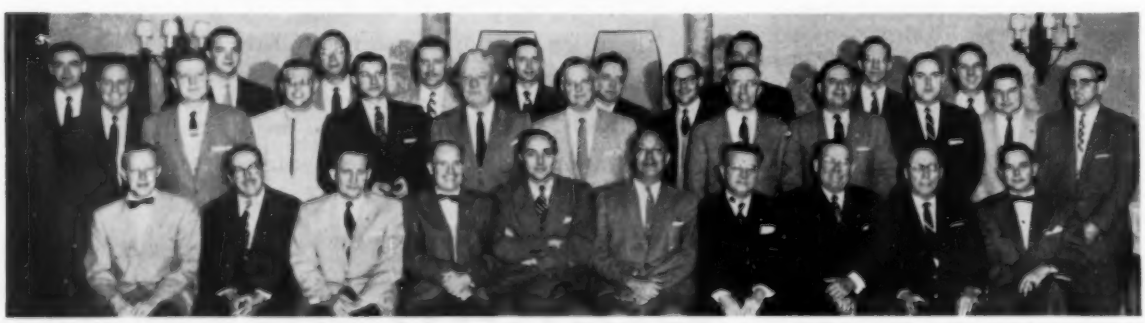
Industrial's Director of Sales, Raymond Ledford, says, "We found it necessary to have a line designed for adaptation rather than stock models. The demand today is for 'completely engineered installations.' Our laboratory and engineering departments are being enlarged 100 per cent to solve specific problems for our clients."

Change of Address—Effective January 30th, the Chicago sales and service office of Parker Rust Proof Company, manufacturers of surface treatments for metals, will be located at 5875 North Lincoln Avenue, Chicago 45, Illinois. The new telephone number is LOngbeach 1-1730.

U. S. Distributor—Dalic Metachemical Ltd. of Toronto, Canada, announces the appointment of the Marlane Development Company of 153 East 26th Street, New York City, as a distributor for The Dalic Process of selective localized electroplating.

Marlane, a consulting firm specializing in the development of modern processes for plating and engineering industries, will be completely responsible for all inquiries and technical servicing of The Dalic Process.

(*more news on page 306*)



The Wyandotte District Sales Managers shown in the above picture have devoted 283 years in service to users of commercial cleaning, washing, processing and germicidal materials. Plans were made during the sales managers conference for the three Regional Wyandotte Sales Meetings soon to be held in Atlantic City, Chicago and Denver

INDUSTRY NEWS BRIEFS

● Industrial research—its motives, its management, and its results—will undergo examination at the first annual National Industrial Research conference. The conference, sponsored by **Armour Research Foundation** of **Illinois Institute of Technology,** will be held April 18 and 19, at the Sherman hotel in Chicago.

● The **Warner Electric Brake & Clutch Company,** Beloit, Wis., will complete a second manufacturing plant costing more than $1 million by mid-1956. The new factory will be built on a 64-acre site located in Illinois, 3 miles south of Beloit on U.S. Highway 51. It will occupy 100,000 square feet initially.

● "Not until the latter half of 1956 will the **Investment Casting Institute** be able to publish its Design Manual, setting forth the practical limits and tolerances of the investment casting process, and explaining fully the advantages and limitations of the process." This announcement was made by V. S. Lazzara, president of the Institute in answer to repeated inquiries concerning the availability of the Manual.

● The world's largest adjustable rail milling machine, weighing 1,230,000 pounds, will soon be installed in the **General Electric Company's** Large Steam Turbine-Generator plant.

● Purchase of "substantially all" of the assets of the **Watson Flagg Machine Co.** of Paterson, N. J. has been announced by the **General Electric Co.** The purchase was effective Jan. 1.

● The formation of **Schwarzkopf Development Corporation** at 320 Yonkers Avenue, Yonkers, N. Y. has been announced by Dr. Paul Schwarzkopf, president and sole owner of the powder metallurgical concern. Dr. Schwarzkopf pointed out that the Schwarzkopf Development Corporation succeeds the **American Electro Metal Corporation** (of Maryland) and its activities will cover all fields of powder metallurgy.

● **E. I. du Pont de Nemours & Company, Inc.,** was owned by 159,009 stockholders as of December 31, 1955, an increase of 3,712 over the number of holders recorded at the close of the third quarter of 1955, and an increase of 9,595, or 6.42 per cent, over the number as of December 31, 1954. There were 143,941 holders of common stock and 21,418 holders of preferred stock as 1955 ended.

● Sales of **Diamond Alkali Company's** chemicals in 1955 totaled approximately $110,280,000, representing an increase of 18 per cent above the 1954 figure of $93,505,000, the previous all-time peak. Net earnings in 1955 increased 53 per cent to approximately $8,440,000.

● A $2,000,000 expansion of **Stran-Steel Corporation's** manufacturing facilities at Terre Haute, Ind., is announced by C. LeB. Homer, president.

● After nearly five years of exploration and development work, **Stauffer Chemical Company** has established the existence of large mineable deposits of high grade phosphate rock on its patents near Bear Lake, Idaho. Reserves in the deposits are estimated at over 5,000,000 tons of commercial grade phosphate rock and may, according to Stauffer, be doubled or even tripled if the beneficiation of lower grade secondary beds proves feasible.

● **Schwartz Chemical Company, Inc.,** manufacturer of dyes, decorative lacquers and bonding agents for the plastics industry, has retained **Milt Bass & Associates** to handle its public relations.

(More "Briefs" on p. 317)

Trouble Free Nickel Plating

●

Trouble shooting with barrel nickel plating is a little more on the mechanical side than still tank plating.

●

Barrel operation is important. While all the mentioned troubles are well known they deserve constant attention to insure freedom from trouble. Many difficulties arise from barrel mechanisms and operation.

●

Barrel speed is important. Most barrels operate somewhere between 2 and 10 rpm. In general barrel nickel is best done in the high part of this range from 5 to 10 rpm. Lower speeds may be used but some parts will not tumble well and at high voltages there is danger of flash burning and peeling. Over 10 rpm. the speed is in the range of burnishing operations and there is some tendency for parts to be thrown free of the mass where they form bipolar electrodes and cause trouble.

●

Contacts are one of the biggest headaches. In barrel nickel plating the most universal type is the flexible dangler coming in through the center of the barrel and with a ball on the end which hangs down into the mass of parts. If the cables are too stiff or the ball too light the dangler will skip over on top of the mass and provide poor contact. Special flexible cable is used which stays flexible regardless of rotation forces. Very small loads may cause an otherwise satisfactory dangler to ride on top and break contact.

●

Cables may also be broken internally to cause loss of current. Dirty saddles may cause poor contact. Short circuits may occur either inside the barrel or at the saddles which give ampere indication but no plate or little plate. For some parts, to insure good contact wooden sticks are jammed in the barrel which break up the parts as the barrel rotates. There are also special contacts which consist of rods across the barrel, Button set into the ribs are also used. While these contacts are efficient in some difficult cases they tend to plate up more than normal and waste nickel.

●

Proper maintenance of barrels is cheap compared to wasting nickel and rejected work.

TRUE BRITE CHEMICAL PRODUCTS CO.
100 FALLS AVE. OAKVILLE, CONN.

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"RELIANCE" PRODUCTS

EFFICIENT • EFFECTIVE • DEPENDABLE

At no charge, our Engineering Department is always glad to make recommendations and help solve your polishing and/or plating problems

RELIANCE SELENIUM RECTIFIERS

BENCH OR FLOOR MODELS

100 TO 5000 AMP OUTPUT

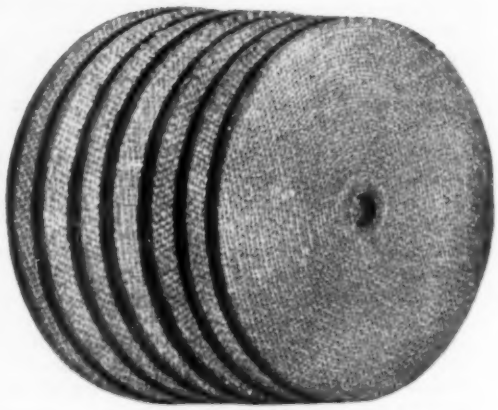
VOLTAGE RANGES

0– 6
0– 9
0–12
0–15
0–18
0–24

REMOTE CONTROL AT SMALL EXTRA COST

For that tough cutting down job on steel or stainless steel, solve your problem with

RELIANCE SISAL BUFFS



Specially treated:

For cooler operation—

For longer life by binding the fibres together to prevent fraying—

For better compound adherence—

To cut faster and bring up a high finish

RELIANCE matching compositions furnished in either molded cakes, or extruded to your specifications.

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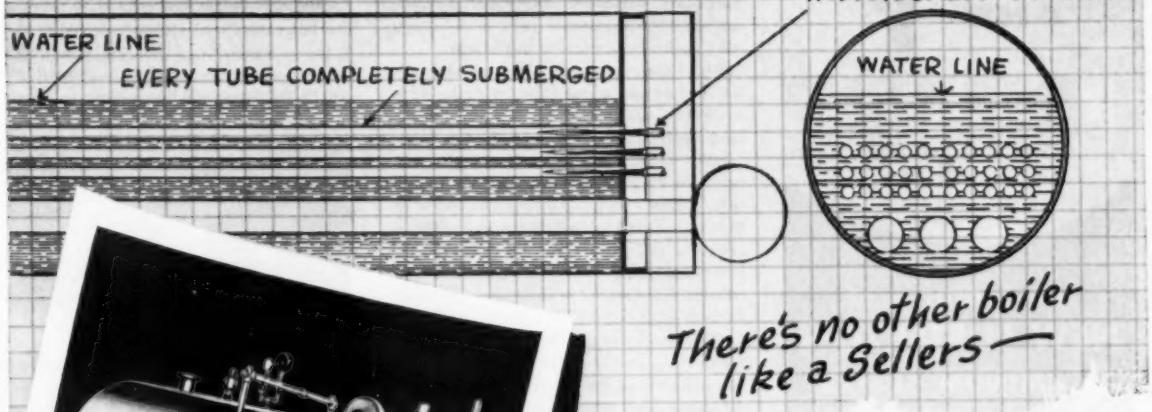
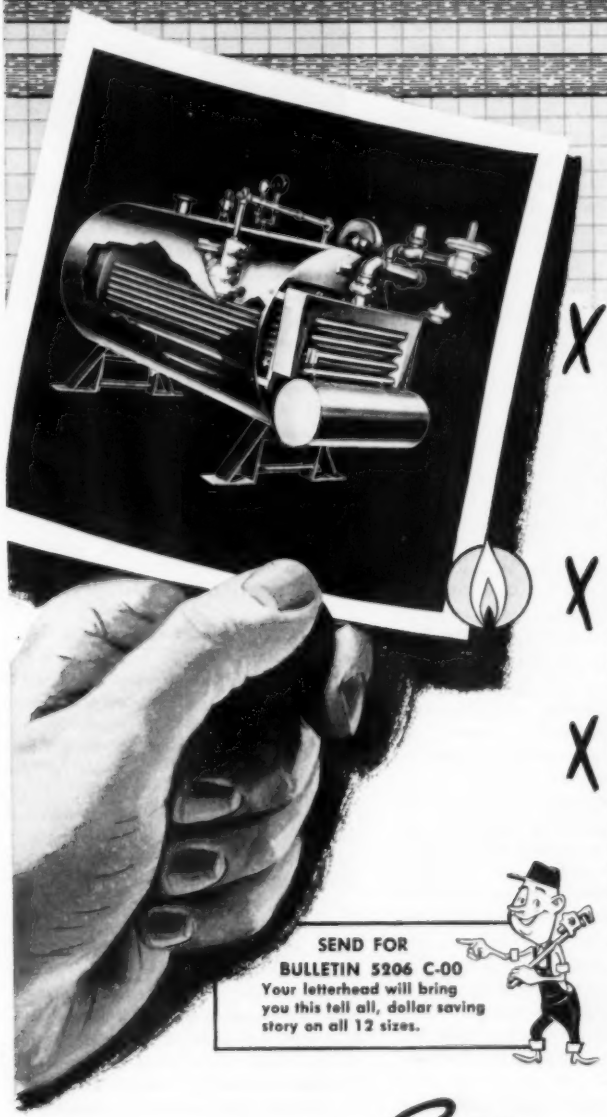
when you buy a steam boiler . . . be sure to look at the picture of a Sellers Immersion Boiler



There's no other boiler like a Sellers—



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BULLETIN 5206 C-00
Your letterhead will bring you this tell all, dollar saving story on all 12 sizes.

every square foot of heating surface is water backed— —100% effective!

The long, individually gas fired tubes in the Sellers Immersion Boiler are all completely submerged nearer the water level—and over the return tubes! Heat is therefore uniformly distributed through them—and directly into the water—no where else!

there's no scale problem!

In immersion heating, the needed long tubes expand and contract sufficiently on intermittent firing to crack loose any hard scale that forms on the tubes. This practically eliminates the scale problem, makes maintenance simpler and increases the boiler's efficiency.

the average flue gas travel is 15 feet!

Maximum, almost complete utilization of the exhaust heat is assured with a Sellers Immersion Boiler. This is a result of Sellers exclusive design—with the firing tubes completely submerged and *located over the return tubes,* there is a long, slow flue gas travel—an average of 15 feet! Heat can only go into the water.

There's no other steam boiler like a Sellers Immersion Steam Boiler. Its simple design gives you a package boiler unit with many other outstanding features. Minimum maintenance and maximum efficiency combine to give you years of remarkably low operating costs. Twelve sizes available!

Sellers ENGINEERING CO.

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Blast Heaters • Immersion Automatic Water Heaters • Combustion Units • Industrial Gas Burners
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- ✓ adheres well, does not leach easily
- ✓ offers extreme economy of use
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Send sample for free laboratory treatment.

THE *Chemical* CORPORATION

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306 INDICATE A 309.

INDUSTRY NEWS

Foreign Subsidiary—The Diversey Corporation, Chicago manufacturer of industrial sanitation chemicals, has announced the formation of a new foreign sales and manufacturing subsidiary.

The new company, Diversey-France, has begun operations from its main office in Paris, according to H. W. Kochs, Chairman of Diversey.

"We have studied the market for our products in France since early in 1954," said Kochs. "The growing awareness of the importance of sanitation in the preservation and flavor of food indicates an increasing demand for the products and consulting services which we will offer French manufacturers."

Diversey-France will use the manufacturing facilities of other French chemical companies until its own plant is completed. Technical and sales personnel have been sent to France to begin training personnel in the manufacture and sale of Diversey products.

On December 21st, Diversey announced the formation of Industrias Consolidadas of Caracas, Venezuela. In addition to France and Venezuela, Diversey now has subsidiaries operating plants in Sydney, Australia; Toronto, Canada; Honolulu, Hawaii; and St. Johns, Newfoundland. Here in the United States, it has plants in Chicago, Newark, South Gate, California and Chippewa Falls, Wisconsin.

Price Reduction On Germanium Rectifiers—A major price reduction on all germanium rectifier models made by Hanson-Van Winkle-Munning Co. has been announced by the company.

Some prices are reduced as much as 25 per cent, depending on voltage and type of voltage control, H-VW-M reports. All price changes on germanium rectifiers are effective as of February 1, 1956.

This reduction will price H-VW-M germanium rectifiers lower than any model previously on the market, the company reports. In a few cases, prices for germanium rectifiers will now be no more than those for comparable selenium rectifiers.

All models are designed for continuous 24-hr. a day operation at full capacity. Voltage range on the complete line of H-VW-M germanium rectifiers is from 6 to 48 volts with current output from 500 to 10,000 amperes, and in combination, unlimited output.

At full load, with output voltages of 15 volts and above, the H-VW-M germanium rectifier is capable of efficiencies in excess of 90 per cent. Voltage regulation of as low as 5 per cent can be obtained from no load to full load at voltage ratings of 20 volts and above, due to low voltage drop across the junction.

Expansion—Northwest Chemical Company, Detroit, Mich., has just completed a major expansion of its Detroit home office and plant facilities, according to an announcement by H. J. McCracken, President and one of the founders of the firm.

The increased space more than doubles the laboratory and research departments, a move necessitated by the company's greatly increased activity in special research for firms seeking custom solutions to their metal cleaning problems.

Double Labs and Research

In addition, the warehouse section has been substantially enlarged and covered; loading facilities for all-weather service have been constructed. A completely new second floor affords modern business office accommodations of more than double the old space.

Organized in 1932, Northwest Chemical Co. is today recognized as one of the foremost manufacturers of specialized metal cleaning chemicals in the country. Its products are available nationally through an organization of sales offices and distributors.

"This expansion move" McCracken explains, "is another step in Northwest's rapid growth, a continuing expansion program to provide better customer service to the metal finishing industry."

Manufacturers' Rep in Tenn.—The appointment of Ben J. Tompkins, Nashville, Tenn., as manufacturers' representative for V-Corr and architectural porcelain enamel products was announced by Toledo Porcelain Enamel Products Company, Toledo, Ohio, a division of the Bettinger Corporation.

The territory of Tompkins, who has had extensive experience in the building materials field, covers the entire states of Tennessee and Kentucky.

Change of Company Name—Resulting from the purchase by Basic Refractories, Incorporated last August of the Kelley Island Company's three plants and related business, the scope of its activities has been expanded appreciably within the last year. This fact and the prospect of future diversification argue the wisdom of removing the limiting connotation of "Refractories" while serving the interests of simplicity and brevity.

The proposed change will retain the company's primary designation "Basic Inc." well-known and accepted through the steel industry which comprises Basic's major market.

Industrial Hygiene—Major significant development in the field of controlling occupational health hazards in industry comes with an announcement by the American Industrial Hygiene Association of a new group of informative bulletins called "Hygienic Guide Series."

Concerned with common industrial materials which present occupational health hazards through toxicity, acute and chronic irritation, the current series summarizes the latest authoritative and substantiated information on: aniline, benzene, formaldehyde, amyl acetate, acetaldehyde, sulfur dioxide, hydrogen sulfide, butyl alcohol (n-butanol), cadmium, and carbon tetrachloride. These and subsequent guides will be made available to industry and other interested persons.

Allied Research Expands—Allied Research Products, Inc., Baltimore manufacturer of the Iridite line of chromate conversion finishes and ARP process chemicals, has just completed a plant expansion that doubles the area available for research and development facilities. The new quarters consist of an addition to the structure located at 4004 E. Monument Street, Baltimore.

The entire first floor of the new wing is devoted to research and development facilities. In addition to providing approximately twice the area available in the old building, allowance has been made for approximately a 50 per cent future expansion. The second floor is devoted to administrative, sales and general office personnel.

These expanded research and development facilities are part of Allied's long range plans of broadening the line of protective and process chemicals it makes available to the metalworking industry.

Sales Reps Appointed—The General Ultrasonics Company of Hartford, Conn. announces the appointment of engineering and sales representatives to cover the New England area for the application of this firm's ultrasonic processing equipment in the fields of electroplating, cleaning, pickling and for research and development purposes.

The entire State of Connecticut will be the responsibility of The MacDermid Sales and Equipment Corporation of Bristol, Connecticut.

The States of Massachusetts, Rhode Island, New Hampshire, Vermont and Maine will be covered by Louis V. Gagnon who will establish quarters after the first of the year at Framingham, Mass.

Merger—Walworth Company, nationwide manufacturers of valves and pipe fittings, has contracted to acquire all the outstanding common stock of the Conoflow Corporation, Philadelphia, a leading producer of pneumatic automatic valve control equipment, Fred W. Belz, Walworth president, announced. This marks the fourth major acquisition by Walworth in recent months as part of its planned expansion and diversification program.

Under the terms of the transaction, Walworth will issue 53,537 shares of its common stock for the common stock of Conoflow. The Philadelphia concern, which serves a wide variety of American industry in the automatic controls field, will be operated as an independent subsidiary of Walworth, retaining present management and employees and continuing present policy.

Contest—A $1,000 prize contest for engineers and designers for the best new applications of thin gauge and/or high-precision tolerance stainless steel strip was announced by Monroe Sherman, president, American Silver Company, Flushing, N.Y.

Complete information as well as entry blanks may be obtained from Chairman, Prize Awards Committee, American Silver Company, Flushing, New York.

Thirty-one separate cash awards will be made in the contest which closes midnight, May 30, 1956. The Prize Awards Committee consists of editors of leading metal papers, professors of the nation's top engineering schools, and members of the technical staff of the American Silver Company. First prize is $350.00.

The contest has been instituted to stimulate America's progressive engineers and designers to create new uses for stainless steel strip that can be rolled down to hitherto unobtainable thicknesses of as low as 0.0005 in and to tolerances as close as ± 0.0001 in. Awards will be made on the basis of originality and practicability. Entry Blanks are available on request.

Better clean up first!

No use trying to cover up poor cleaning with decorative plating. Get rid of blisters and blemishes *before* they show up.

Cowles FE ELECTRO CLEANER

gets *all* of the soil because it *gets to* all of the soil. No crevice or corner escapes its soil-penetrating power.

GET THE FULL STORY ON HOW Cowles FE ELECTRO CLEANER penetrates soil (rapid wetting) dislodges soil (high current capacity) disperses soil (through emulsifying)

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Cowles CHEMICAL COMPANY
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See Cowles Advertisements On pages 318 and 326

INDUSTRY NEWS

Canadian Subsidiary—F. J. Stokes Company of Canada, Ltd., has been established as a subsidiary of F. J. Stokes Machine Co., Philadelphia, Pa., to carry on the steadily growing operations in Canada of the parent organization.

Francis Dougherty, Jr., president of the American company, will also head the new Canadian subsidiary. Its other officers will be Francis J. Stokes, Jr., and Allan A. Hutchings, vice-presidents; David E. Stokes, secretary; and Erwin R. Scott, controller—all of whom hold corresponding positions in the parent company. J. William Robinson, a native Canadian who has been manager of the Stokes Canadian sales office in Montreal since it was opened in April, 1953, will continue in charge of all Stokes Canadian operations under the new company. Headquarters of the company are now located at 27 Wellington St. East, Toronto.

In announcing the action of the Stokes' board of directors, Dougherty said: "We have been impressed with the rapid development of industry in Canada and are convinced that the country has a tremendous potential for growth. We are eager to contribute our knowledge of automatic production techniques to facilitate this growth."

The Stokes Company, founded in 1895, makes a wide range of production equipment and is one of the largest manufacturers of high vacuum processing equipment; plastics molding, industrial tabletting and powder metal presses; and pharmaceutical machinery. Its equipment is already in wide-spread use throughout Canada.

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the Perfect Combination

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ZIPPO CLOTH BUFFS

These famous long-wearing buffs run cool under all buffing conditions. High count bias-cut cloth is assembled on ventilated steel centers. Each section is perfectly balanced and faced—requires no raking.

BUFFING COMPOUNDS

Formax produces a complete line of buffing compounds in bar, tube and liquid form.

Our extensive manufacturing, laboratory and testing facilities are at your disposal.

ZIPPO SISAL BUFFS

You have a pleasant surprise coming if you haven't tried the new Zippo bias-type sisal buff. It was specifically developed for steel buffing—to blend polishing grit lines—to cut down stainless steel—and bring up a bright lustre.

Other Formax products include the well-known C-20 Flexible Contact Wheels and F-26 Abrasive Belt Grease Stick.

Descriptive Catalogs Sent on Request

FORMAX MFG. CORP.

DETROIT 7, MICHIGAN

"THE FOUR McALEERS"

INDUSTRY EDITORS TO JUDGE ELECTROPLATING COURSE CONTEST

Joseph B. Kushner, director of the Joseph B. Kushner Electroplating School of Stroudsburg, Pa., takes pleasure in announcing that Ezra Blount, editor of Products Finishing, Archimedes Doria, editor of PLATING, and Nathaniel Hall, editor of Metal Finishing, will act as judges of the school's annual essay contest for a free home study course in modern electroplating. The course offered as the prize, "Electroplating Know-How," is known throughout the world for its excellence and comprehensiveness. It has a cash value of $125.

The winner of the scholarship contest will receive the complete "Electroplating Know-How" course and will receive a certificate on completing it. The school is licensed by the Pennsylvania Department of Public Education to give such a certificate.

The two next best entries will each receive a "Sur-Ten Meter," a handy instrument for measuring the surface tension of plating baths and dips, worth $16.35. The four next best entries will each receive a set of three "Tank Doctors," solid vinylite trouble shooting charts that mount right at the plating tank for convenient reference, worth $9 a set. Every contestant will receive a free copy of the valuable booklet, "Surface Tension Secrets for Electroplaters."

The contest is open to anyone associated with the metal finishing industry. Previous winners have ranged from a plater's helper to an executive chemist. To enter the contest, the contestant must submit along with his official entry blank, fifty words or less, completing the following statement: "There are now more opportunities than ever in the electroplating field because . . ."

Entries will be judged solely on originality, clearness, and sincerity of thought. Fancy rhetoric will not count. The decision of the judges will be final.

Official entry blanks are available without obligation on application to Electroplating Scholarship Contest, Box 230, Stroudsburg, Pa. The contest closes May 30, 1956 at midnight. Entries postmarked after this date will be ineligible. Prize winners will be announced as soon as possible after the contest closes.

New Distributor—Ramco Equipment Corporation is pleased to announce the appointment of the Baker Distributing Company, Cleveland, Ohio, as an authorized distributor for Ramco Vapor Degreasers, Power Washers and allied finishing equipment. J. C. Baker, president, was formerly with the research division of Rheem Manufacturing Co. Baltimore, Md. The Baker organization will cover Ohio, Indiana, and Western Pennsylvania.

102 Hands

To Help You Find the Answers to Electroplating Problems

Members of the Du Pont customer service team are strategically located near plating centers to bring you prompt help on any immediate electroplating problem.

When trouble breaks, one of these specialists is only a phone call away. He is equipped to handle specific problems ranging from improperly operating baths to unsatisfactory deposits of metal. He'll suggest correct bath compositions, plating times and cleaning methods to assure you of best plating results. Recommendations are compiled and presented in a special, confidential report for your use.

If you need help to find the answer to your plating problems, give our customer service man a call at the Du Pont office nearest you.

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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

ELECTROCHEMICALS DEPARTMENT
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WILMINGTON 98, DELAWARE

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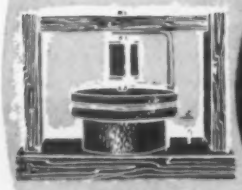
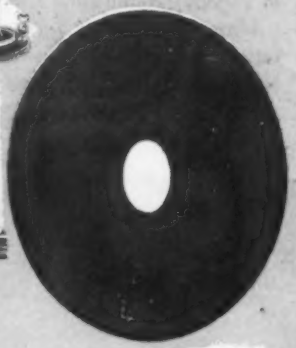
The FIRST ELECTRIC LIGHT BULB by Thomas Edison





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Holders of the *Original* Bias Sisal Buff Patent No. 2642706

Specialized know-how and the demands of modern industry . . . these bring progress. The vision of a cool-running, fast-operating buff adaptable to various requirements led to the first Sisal Buff by the JOE-D Buff Co. The amazing efficiency and economy of JOE-D "Fray-Proof" Bias Sisal Buffs marks them as *leaders* in the industry. Specify JOE-D—the *Original* Bias Sisal Buff—for every requirement.

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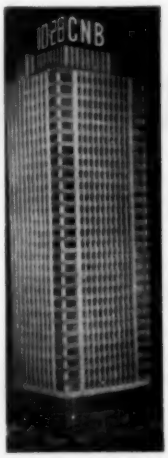

INDUSTRY NEWS BRIEFS

Largest revolving super-accurate clock-sign in the nation. This giant sign featuring numerals 25 feet high will flash the time with split-second accuracy to Fort Worth residents when it is erected atop the new six million dollar, 30-story Continental National Bank Building next summer. Designed and engineered by Federal Sign and Signal Corporation, and to be constructed and installed by Federal Sign Company of Texas in Fort Worth, the 77-ton sign is longer than an average freight car, produces 3 million candle power of light, and is expected to be visible to Texans from at least three miles off.

● The directors of **Atlas Powder Company** have approved the acquisition of **Aquaness Corporation.**

● **Metal & Thermit Corporation,** New York, and **United Chromium of Canada, Limited,** Toronto, will combine Canadian activities under the name of **Metal & Thermit—United Chromium of Canada, Limited.**

● A unique Tool Charge Rebate Plan has been introduced by **Engineered Precision Casting Company,** Matawan, N. J. The plan has been inaugurated to commemorate the company's tenth anniversary. The details of the plan include the offering of a 15 per cent reduction or refund on the tooling charge of the first part for which an order is placed between November 1, 1955 and October 31, 1956. A maximum of $50.00 will be allowed.

● A new plant, new process, and new line of production are involved in the announcement by **Solvay Process Division, Allied Chemical & Dye Corp.,** that its hydrogen peroxide installation at Syracuse, N. Y., under construction for the past eighteen months, has gone into operation.

● **Collapsible** metal tube shipments for a single month reached an all-time high of 100,568,304 units in November, the **Collapsible Tube Manufacturers Council** report.

● **General Electric** predicts that by 1965 each U.S. worker will use as much electricity every working hour as it takes to light 1,000 one-family homes for the same period.

● A $5,000,000 building program has been announced which will give **Armour Research Foundation** of **Illinois Institute of Technology** one of the most complete industrial research centers in the world. The expansion program calls for the construction of three buildings and substantial additions to two buildings over the next 10 years.

● **Kaiser Aluminum & Chemical Corporation** will construct an $8-million caustic-chlorine plant adjacent to the company's new alumina plant to be built at Gramercy, La.

● **Kaiser Aluminum & Chemical Corporation** has announced it is entering the aluminum food container business with two plants, one on the West Coast and the other in the Mid-West. The West Coast plant is being acquired through the purchase of **Foil Kraft, Inc.,** of Los Angeles. The Mid-West aluminum container plant will be a new facility, costing more than one million dollars, at Wanatah, Ind., approximately 55 miles east of Chicago.

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has all these advantages

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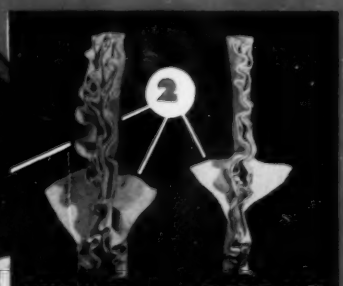

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BRANCH OFFICES — PHILADELPHIA, DETROIT, LOS ANGELES, INDIANAPOLIS, GRAND RAPIDS

INDUSTRY NEWS

Heads Polio Drive—Mariano Ranno, a partner in the firm of Imperial Plating Co., Brooklyn, N. Y., has accepted the chairmanship of the metal plating industry's campaign for the 1956 Greater New York $3 million Appeal of the National Foundation for Infantile Paralysis, according to an announcement by Harris A. Dunn, vice-chairman of the board of the Bowery Savings Bank, who is general chairman of the city-wide drive.

In accepting the divisional chairmanship, Ranno reiterated the fact that further funds still were urgently needed to help support the nation-wide four-point program of the March of Dimes. Namely, this program includes the support of 14 centralized local respiratory centers where over 3,000 polio sufferers depend upon Foundation-sponsored mechanical breathing devices to stay alive; continuance of further scientific research to safeguard the future of the fight against polio; training much needed personnel to work with polio patients; and extending hospital and medical assistance to the 68,000 polio patients previously stricken by the disease.

Manufacturers' Reps—The appointment of Howard S. Jones and Company, Chicago, Illinois, as manufacturers' representatives for V-Corr and architectural porcelain enamel products was announced by Toledo Porcelain Enamel Products Company, Toledo, Ohio, a division of the Bettinger Corporation.

The territory of the new representatives will cover the city of Chicago, central and northern Illinois, and southern Wisconsin.

Howard S. Jones and his associate in the company, Willis C. Brown, have had extensive sales experience in the building materials and roofing fields. In addition to functioning as manufacturers' representatives, the company will also warehouse V-Corr and serve as installation contractors for both V-Corr and the line of architectural panels.

Engineering and Pilot Production Building—Sylvania Electric Products Inc. has announced plans for a new engineering and pilot production building in Towanda for the company's Tungsten and Chemical Division.

M. E. Pettegrew, general manager of the division, said construction of the new 48,000-square-foot building will begin at Sylvania's North Towanda location late this year and will be completed in the summer of 1957.

To be devoted entirely to development laboratories and pilot production facilities, the new three-story brick structure will be built to meet requirements caused by the expanded activity of the Tungsten and Chemical Division in the fields of semiconductors, phosphors, chemicals, and metallurgical products.

With the completion of the new building, whose design and construction will be supervised by Sylvania's Facilities Planning office, activities of the Tungsten and Chemical Division will occupy over 300,000 square feet of space. The division has its headquarters and principal facilities in Towanda, and a smaller plant in Troy, Pa.

Sylvania's operations in Towanda have grown steadily since the company first purchased the Patterson Screen Company's fluorescent powder plant in 1941. Five years ago, in 1951, the division's 127,500-square-foot main building in North Towanda was completed, housing administration, sales, and design engineering offices, manufacturing facilities, and other functions. The division now employs about 800 men and women.

Autonomous Units—Completing the divisionalization of management responsibility and administrative functions covering its nationwide operations at 15 plants, Diamond Alkali Company, Cleveland, Ohio, has established two additional autonomous units, effective February 1.

To be known as the Electro Chemicals Division and the Soda Products Division, respectively, the newly-established operating units will function autonomously in the same manner as Diamond's five other, previously created divisions. Both groups will assume for their respective organizations all sales, research and plant manufacturing activities, with performance responsibility in each unit to be vested in a division general manager.

Have you tried
"LIQUID ENVELOPE"
The Original Time-Tested
Strippable Stop-Off
Spray, dip or brush on!
Peels as easily as a banana!
• Impervious to nickel, chromium, copper, brass, alloy and precious metal plating solutions.
• Not affected by ordinary cleaning dips.
• Coating dries as fast as lacquer.
• Coating does not creep at the stopped-off areas.
• Sharp line of demarcation.
• For detailed data and working sample, write Stop-Off Department
BETTER FINISHES & COATINGS, INC.
268 Doremus Avenue, Newark 5, New Jersey
BFC

New Company—Formation of Resources Research, Inc., a firm of consultants specializing in solving air and stream pollution problems for industry and Federal and state governmental agencies, has been announced by Dr. Louis C. McCabe, formerly Scientist Director in the United States Public Health Service.

Dr. McCabe, who served as the first Director of the Los Angeles Air Pollution Control District, will be joined in the new enterprise by Frederick S. Mallette, Executive Secretary of the Committee on Air Pollution Controls and Research Manager of the American Society of Mechanical Engineers, and William S. McCabe, consulting geologist of Casper, Wyo.

The Company will handle research and development in geology, mining, industrial wastes, water resources, and the economics and supply of conventional and atomic fuels. It will deal with such specialized problems as fuel sources and their evaluation for power, metallurgy and chemistry; research and engineering in air and stream pollution; water treatment and supply problems; and the development of fuel resource properties.

The staff of the new firm will include specialists in chemistry, chemical engineering, geology, physics, economics, and industrial engineering. The aim is to bring together into one organization outstanding men in the highly specialized aspects of these fields, to provide a coordinated, readily available source of engineering and scientific talent for industry and government. As new contracts warrant, additional technicians will be employed.

The main office of Resources Research, Inc. will be in the Wisconsin Building, 4435 Wisconsin Avenue, N.W., Washington 16, D. C.; with offices in New York City at 55 West 42nd Street and in Casper, Wyoming care of P. O. Box 1861.

The Economy of the U. S.—By 1976, the United States, needing to produce $750 billion annually in goods and services, could find it is 76,000,000,000 man-hours short of filling this production goal, according to the Du Pont employee magazine, "Better Living." Only by automation and similar technological improvements can the nation hope to avoid this dangerous labor shortage, it commented.

The solution to the theoretical problem posed by a demand growing out of proportion to the anticipated population increase lies in vastly improved technology, the magazine said in its January-February issue.

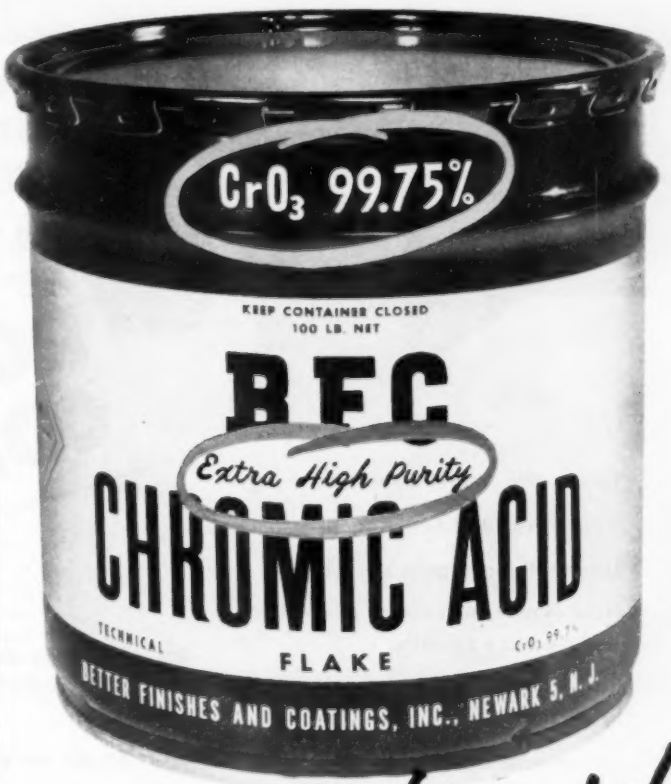
In the lead article, entitled "Labor Shortage Ahead," the magazine said the United States in its Bicentennial year will have an estimated population of 216,000,000 with a demand for goods and services twice what it is today, based on trends of the last 80 years.

New Mine—Metal & Thermit Corporation, New York, has purchased an 800-acre tract in Virginia, and will soon begin construction of a plant for mining and processing of titanium-bearing ore, H. E. Martin, president of Metal & Thermit, has announced. Construction will start in the spring of 1956 and the plant will be completed in the fall. The project is expected to cost approximately $750,000.00; when completed the plant will employ between 40 and 50 people.

The 800-acre tract in which Metal & Thermit has obtained mineral rights, is located in Hanover County approximately five miles west of Montpelier, Virginia.

The plant to be erected will be a conventional gravity ore dressing plant, equipped for crushing the ore and extracting the materials by magnetic separation. Plans and engineering requirements of the new facility are now being completed by Metal & Thermit's Central Engineering Department.

New Chromium Oxide Facilities—The Geo. B. Smith Chemical Works Inc., Maple Park, Illinois, has just announced the completion of facilities to further increase the capacity and production of their chromium oxide plant. The Geo. B. Smith Chemical Works Inc. is presently manufacturing pure, sulphur-free chromium oxide for the tile, rubber, ceramic and metal manufacturers; also a complete line of dry colors for the building trades. They estimate the new facilities will double their chromium oxide production.



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Massive motor generator rotors weighing thousands of pounds are balanced to within fractions of an ounce by this modern equipment in the Chandeysson plant. By spinning the rotors, even the slightest out-of-balance is detected and can be corrected. The result is vibrationless dc equipment that promotes perfect commutation and reduces installation cost . . . advantages that can never be obtained by static balancing such as is common in the industry.

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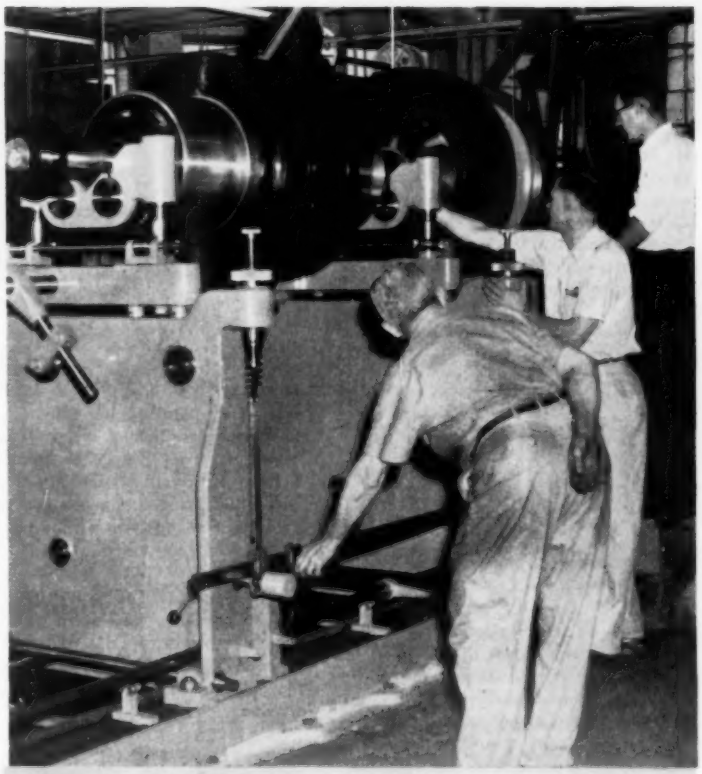

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PERSONALS

Hanson-Van Winkle-Munning Co., Matawan, N. J., announces the appointment of **Myron B. Diggin** as vice-president and director.

Diggin has been with H-VW-M 25 years, its technical director for the past nine years, and was made an assistant vice-president in 1954.

He joined H-VW-M as a chemist, and was appointed chief chemist in 1933. His work has resulted in a number of developments and patents, particularly in the depositing of cadmium, zinc and lead; in rack coatings, anode diaphragms, and regenerative plating systems. During the past year he has worked on the specific development and use of H-VW-M electrochemical processes.

The abrasives division of Elgin National Watch Company has appointed **William H. Baudouine** new division sales manager. Baudouine will also direct national sales of Elgin's diamond abrasives and Elgiloy, non-corrosive spring material. He joined Elgin in 1953 as sales engineer and had been assigned to the Northern Illinois territory including Chicago.

Lampman

Baudouine

Some men attribute longevity to temperance or to intemperance, to wild living or to quiet living. But **Edwin A. Lampman,** who retired on January 3, 1956 from Acheson Colloids Company, Port Huron, Mich., after many years as a service engineer, has a different reason—colloidal graphite. Still very active at the age of 70, Lampman says, "I use 'Oildag' every thousand miles and see my garage mechanic twice a year." He strongly urges others to adopt this formula.

Lampman is a member of the American Society of Lubrication Engineers.

Thomas J. LaBounty elected as vice-president of Bee Chemical Company and its wholly owned subsidiary, LOGO, Inc., is announced by president, **M. A. Self.** His major responsibilities will be customer relations, sales, advertising, and market analysis.

Dr. R. J. Rohr of Amsterdam, Holland, has been appointed managing director of Ipsen Industries International N.V. with plant and office facilities in Amsterdam. Rohr is a member of the Chicago Branch, AES.

A. F. Tydeman has been named director of purchasing at Kropp Forge Company, Chicago. He succeeds **Edward A. Ulvestad** who was made assistant production manager.

Tydeman, formerly assistant controller for the company, joined the firm in that capacity in Sept., 1950. Prior to that he was associated with United Air Lines.

Tydeman

Vaughan

John W. Vaughan has joined the Alter Company, Davenport, Iowa as assistant to the vice-president, Alloy Metal Division. He comes to Alter Company from the former position of district manager, STEEL magazine and is a graduate of Purdue University. His position will enable him to maintain personal contact with the company's many master nickel alloy customers.

Steve Demain, University of Illinois, ChE 1949, has associated with the Time Chemical Corp. He will be director of technical sales and development for the metal cleaning and finishing compound division.

Demain

Ilko

William B. Ilko has been appointed administrative assistant to **Henry Ervin,** vice-president and director of sales, American Chain & Cable Company, Inc.

Hanson-Van Winkle-Munning announces the appointment of **James A. Badaluco** to the post of assistant vice-president. He continues in his major responsibilities as manager of national buffing compound sales and becomes senior executive at the J. C. Miller Division in Grand Rapids, Mich.

Munning

May

Frederick W. May continues in his present responsibilities as manager of sales, J. C. Miller Division, and in addition becomes the next ranking executive at Grand Rapids. May joined the Miller organization in March, 1945, as sales manager. Prior to that he was with The Electric Auto-Lite Co. of Toledo, Ohio, for 18 years, serving as assistant director of purchases from 1935 to 1945.

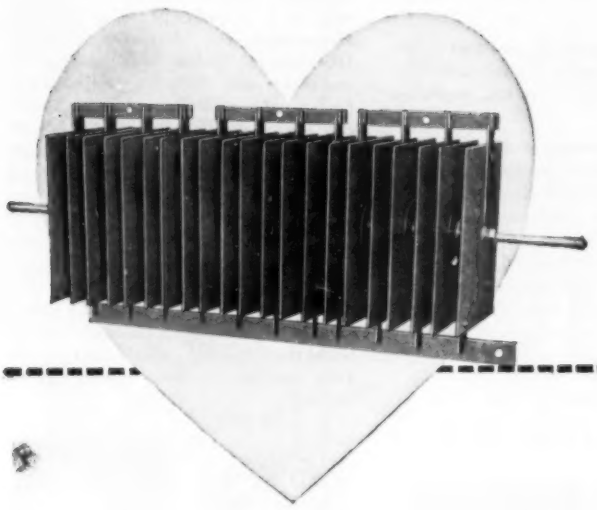
Badaluco began his career with J. C. Miller in 1937 as a chemical engineer. In 1945 he became chief engineer of that company, in charge of the plating phase of the business. In 1951 he became a vice-president in charge of research and development of J. C. Miller, and in 1953 was made executive vice-president of that firm.

He continued with J. C. Miller when that company was acquired by Hanson-Van Winkle-Munning in 1954, and has since functioned as national sales manager of buffing compound.

Badaluco is a past president of the Grand Rapids Branch of the American Electroplaters' Society. He is also a member of the American Society of Metals and of the American Society of Testing Materials.

Just a week after the above announcements were made the retirement of **Nicholas A. Munning,** vice-president of Hanson-Van Winkle-Munning Company, was made known by the board of directors of the company.

Munning has served in numerous capacities during his 38 years' association with H-VW-M. He joined the firm in 1918, serving as factory manager at the Chicago branch. In 1923 he moved to the main plant at Matawan as assistant purchasing agent and served successively as assistant treasurer and credit manager. He was elected a director of the company in 1940, served as secretary for six years and became a vice-president in 1952, the position he held at the time of his retirement.



Six Square Inches per Ampere* of "Heart"!

The selenium stack is the heart of any selenium rectifier. For it is the quality of the stack and its accompanying circuitry that determines the effectiveness of a rectifier, just as the state of the heart and blood vessels of a human determine his strength and health.

IT'S A PROVEN FACT, RAPID RECTIFIER STACKS STAND UP LONGER IN HARD SERVICE. HERE'S WHY:

1) Rapid allows 6 square inches per ampere of plate surface in full wave bridge circuits. For years we have maintained this standard (somewhat higher than other makes), since we feel allowing this much area results in maximum life expectancy.
2) The plates in Rapid stacks use triple purified Selenium.
3) They are carefully tested and balanced for even current distribution.
4) They are coated with an exclusive material rendering them absolutely impervious to the corrosive conditions existing in plating rooms.
5) The plates are spaced an average of ½ inch, diminishing the possibility of dust, dirt and corrosive material becoming lodged between plates, thus allowing heat to dissipate readily.

Rapid designs its stacks to much higher standards than most other manufacturers.**

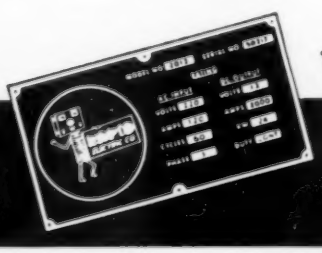
For example:

In tests performed at ambient temperatures of over 30°C, a recognized electrical manufacturers' group standard allows a temperature rise in the stack of 60°C; and, a rise of 40°C at the same ambient temperature for 1000 hours is permitted without derating.

Rapid standards permit a maximum stack temperature rise of only 22°C above the ambient. This low rise is made possible only because of the large area used per ampere, the plate spacing, high purity of Selenium used, the advanced circuitry and the engineering skill which designs the complete rectifier unit for the specific job.

So, when you buy a rectifier, check its heart. Make sure the one you buy offers the most advanced design for longest life . . . In other words, make sure you get a Rapid Rectifier.

*In forced air cooled, three phase, full wave bridge circuit units.
**All three phase rectifiers are designed with a full wave circuit.



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PERSONALS

Appointments to six new managerial and administrative positions in Diamond Alkali Company's newly-formed Electro Chemicals Division were announced at the firm's general headquarters by **Frank Chrencik,** general manager of the division.

These promotions effective February 1:

Wilburn J. Butler, assistant works manager at Diamond's Deer Park plant at Houston, Texas, for the past two years, becomes works manager.

Jack R. Horacek, assistant works manager at Diamond's Muscle Shoals plant since November, 1954, takes over the duties at Deer Park relinquished by Butler.

James H. Fall, Jr., for the past eight years superintendent of Diamond's Edgewood plant, succeeds Horacek at Muscle Shoals.

Edward I. Fogelman, assistant superintendent at Edgewood since mid-1954, moves up to superintendent, replacing Fall.

Ralph H. Parsons, presently inorganics chemicals production manager at Deer Park, becomes staff assistant to Chrencik, assisting him in coordinating the new division's electrolytic operations at five plants (Houston; Edgewood, Maryland; Muscle Shoals, Alabama; Pine Bluff, Arkansas; Painesville, Ohio). Parsons will be located at Diamond's general offices in Cleveland.

Charles V. Nicholson, formerly manager of the International Division, has been appointed general manager of product sales for F. J. Stokes Machine Company, Philadelphia, Pa. Reporting to **A. A. Hutchings,** Stokes vice-president in charge of sales, Nicholson will direct all headquarters sales and marketing activities, both domestic and international, for all of Stokes product lines, which include high vacuum equipment, plastics, molding presses, and industrial tabletting and pharmaceutical machinery.

He is presently vice-president of the Foreign Traders Association of Philadelphia and chairman of its educational committee, which conducts forums for export sales managers. He has also been a member of the Export Manager's Club of New York and the National Foreign Trade Council.

Nicholson

Middleton

Metal & Thermit Corporation has announced the election of two new directors. They are **Cornelius W. Middleton,** vice-chairman, Munitions Board, Department of Defense, and a director of The Babcock & Wilcox Company and of Peoples National Bank, Charlottesville, Va., and **Lester C. Rogers,** president of Bates & Rogers Construction Corporation and vice-president elect, Associated General Contractors of America, Inc.

Cornelius Middleton has been associated with Babcock & Wilcox since 1918. He was assistant to the president from 1918 to 1924 when he was named a vice-president. He served as vice-president and director from 1925 to 1948 and since 1948 has been a director and consultant.

Middleton is a member of the American Society of Mechanical Engineers, a vice-president of the Society of Naval Architects and Marine Engineers, and a member of the Society of Naval Engineers. He was born in Brooklyn, N. Y., and was graduated from Cornell University as a civil engineer in 1916.

Lester Rogers is a member of the American Society of Civil Engineers and the Western Society of Engineers. He is a trustee of George Williams College and is president of the Chicago City Missionary Society of the Congregational Churches.

Rogers is a native of Elgin, Ill., and was graduated from the University of Wisconsin as Bachelor of Science in Civil Engineering in 1915.

Just hanging soiled metal parts in a tank of soak cleaner won't necessarily get them clean. You've got to be sure that the cleaner *gets into the soil.*

You *can* be sure with . . .

Cowles **NS SOAK CLEANER**

Cowles NS Soak Cleaner penetrates deep into crevices and recesses to wet-out crusty soil deposits. Emulsifies oil and grease. Disperses drawing, stamping and buffing compounds.

No scum on the cleaning tank to foul cleaned metal coming out. Clean it with Cowles NS Soak Cleaner and it stays clean.

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Cowles CHEMICAL COMPANY
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See Cowles Advertisements on pages 307 and 326

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CADMIUM BRIGHTENER

The BEST One's Even BETTER!

ROHCO SUPER XL:

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2. Has amazingly wide latitude of concentration range—for even more simple control.

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4. Changeover from ROHCO 20XL does not require company or government specification changes—no conversion problem.

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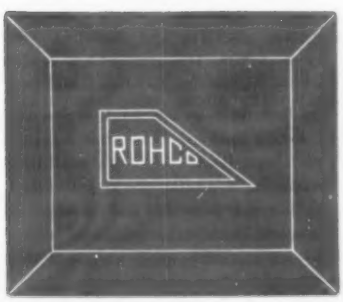

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"THE HULL CELL TEST MAKES PLATING BEST"

L—300. Scientific Apparatus Makers Association Standards—Copies of five recently published SAMA Standards are now available:

SAMA Standard RC4-10—1955 "Bimetallic Thermometers," SAMA Standard RC5-10—1955 "Resistance Thermometers," SAMA Standard RC6-10—1955 "Filled System Thermometers," SAMA Standard RC7-10—1955 "Glass Stem Industrial Thermometers," SAMA Standard RC8-10—1955 "Thermocouple Thermometers (Pyrometers)."

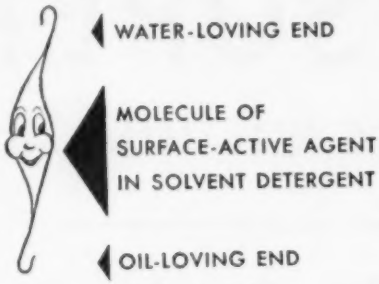
L—301. Laboratory Emergency Chart—The publication of a *new edition* of the Fisher Laboratory Emergency Chart is good news. This chart is the comprehensive, condensed, *alphabetical* compilation devised by Fisher safety specialists in consultation with top safety experts from the U.S. Food & Drug Administration, American Public Health Association, U.S. Bureau of Mines, National Safety Council and U.S. Public Health Service, as well as private toxicologists and members of safety committees of leading university chemistry departments.

A-to-Z (Acetone to Zinc)

The chart is 18 inches x 27 inches, with metal edges at top and bottom and a metal eyelet for hanging on the wall. It's printed in vivid black and red on "Texoprint," a new fiber-and-plastic material—hence it will not curl or fray. Washable, too!

The Laboratory Emergency Chart is offered without charge to established laboratories.

L—302. Cleaning with Solvent Detergents—The cleaning uses and abilities of solvent detergents—solvents compounded with surface active agents—are described in a booklet recently revised by Oakite Products, Inc., manufacturers of industrial cleaning and related materials.



Two Loving Ends

The sixteen-page, illustrated booklet tells how solvent detergents, used without heat, remove oily films, smuts, cutting, drawing and stamping compounds, zinc chromate primers from aluminum, and synthetic paints from steel, while providing temporary protection against rust after painting.

L—303. Phosphatizer Folder—A new descriptive folder explaining the operating procedures for Dura-Kote, DuBois' new paint preparatory cleaner and phosphatizer for metal in process, is now available from the DuBois Co., Inc., Cincinnati, Ohio. The folder describes in detail the steps necessary to get first-class phosphate coatings.

L—304. "Golden Treatment"—An actual sample of sisal yarn with only one end chemically treated is featured in a new, informative "Golden Treatment" booklet now available free to buff users from American Buff Company, Chicago.

Appropriately entitled, "What You should know about the 'Golden Treatment' on sisal buffs," the pocket size manual is an easy-to-read reference which scientifically, yet concisely explains why sisal and cloth require this exclusive new process recently developed by the American Buff Company. From experimentation to the finished buff, the booklet depicts "Golden Treatment" results—the sisal fibers are strengthened and bound together to eliminate fraying, give long wear and hard cutting action. The fiber strand "Comparison Test" permits each buff user to see and feel the difference in the fiber before and after the "Golden Treatment."

The handy 8-page booklet is strikingly printed in gold against black and white.

L—305. Blast Cleaning Abrasive—A bulletin describing Wheelabrator Steel Shot, a cast steel, heat treated, blast cleaning and peening abrasive, has been published by Wheelabrator Corporation.

The booklet includes a tabular comparison of the characteristics of the various types of metallic abrasives, a discussion of the factors important to the economical and efficient consumption of abrasive and performance data on Wheelabrator Steel Shot. Such data includes the specific application, the size of abrasive used, and cost data (both with this abrasive and others at the same plant.)

L—306. Horse Head—The New Jersey Zinc Company publishes an informative bulletin. The continuous galvanizing line is a highly automatic system of producing zinc-coated steel sheets at a rate of from 12 to 15 tons per hour. This recent development by the galvanizing industry, largest consumer of zinc metal, is the feature story of this issue of the Horse Head Bulletin.

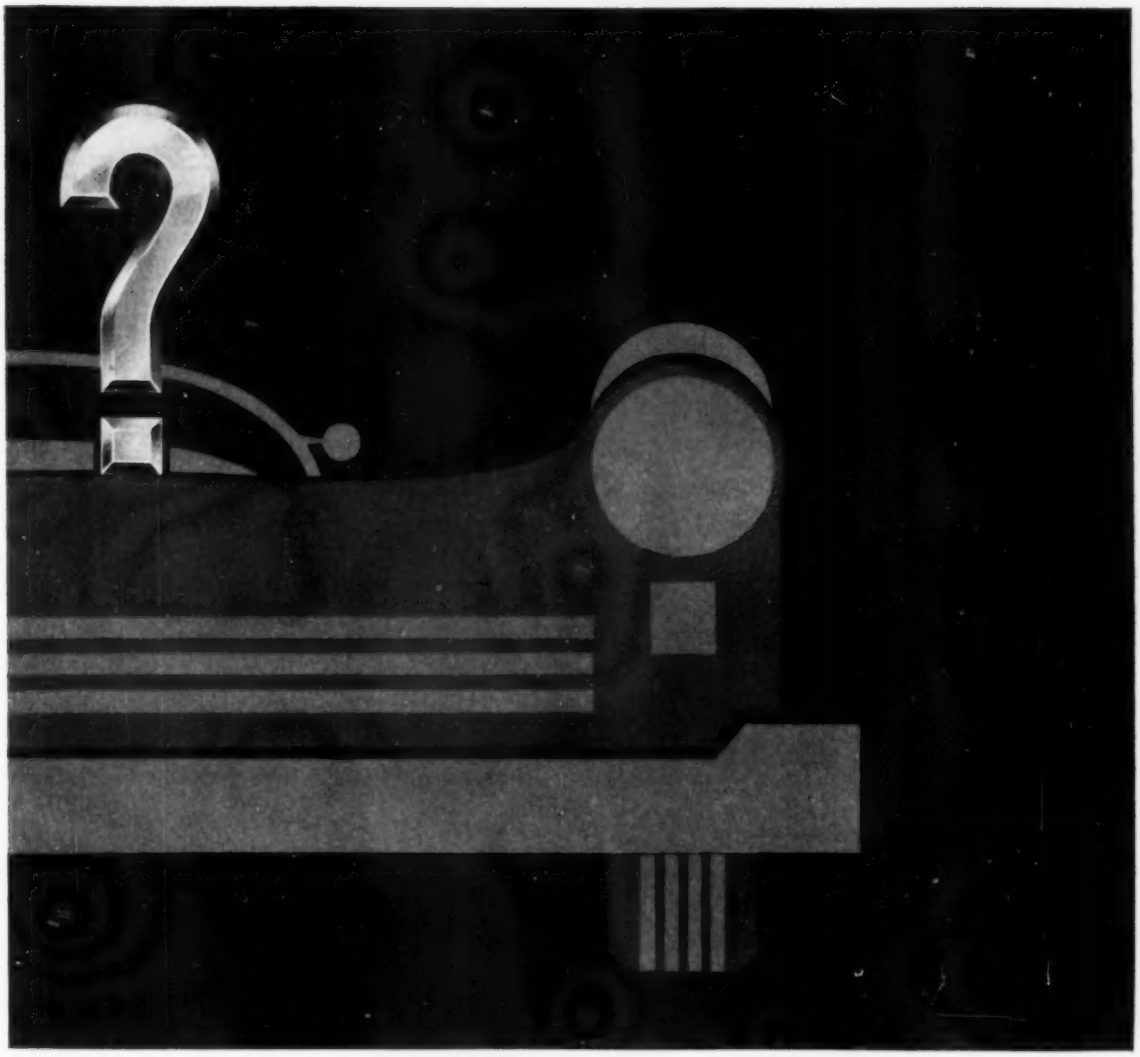
L—307. Three from H-VW-M—1. A two-color, four-page bulletin describing and illustrating Germanium rectifiers is offered by Hanson-Van Winkle-Munning Co. The Germanium rectifier is the latest addition to H-VW-M's line of power equipment for electroplating, anodizing and related processing.

2. A two-color, twelve-page technical bulletin describes and illustrates the H-VW-M Selenium Rectifiers for electroplating, anodizing and related processing.

The bulletin lists construction, electrical and control features of this rectifier. Also included are the specifications of standard bench, self-contained, and remote controlled types of rectifiers. These detail the ac input, dc output, controls, protection and meters available on each of the three models.

3. A 16-page technical bulletin describing a versatile nickel plating process is also offered by Hanson-Van Winkle-Munning Co. Called Sulfamate Nickel Plating, the patented process can produce nickel deposits with considerable variations of stress, hardness, tensile strength, elongation, ductility and electrical resistivity properties. It is applicable to a wide variety of engineering and functional uses.

The bulletin describes solution preparation, listing optimum and limit amounts for each ingredient; effects of constituents in producing deposits; effective temperatures, current densities and voltage requirements; purification methods; equipment and materials used; and analytical procedures for four constituents.



Grill Diamond's service department on chrome plating

Call in DIAMOND technical specialists when you run into a chrome-plating problem. These experienced men work only on customers' questions. They deliver complete, profit-making answers. Their service is free.

In making chromic acid, DIAMOND controls quality through every step. DIAMOND experience begins with importing the chrome ore and making the soda ash. It includes production and delivery . . . even standing by your side, if you wish, to help you get top-quality plating results at low cost.

DIAMOND facilities—two chromic acid plants and nine warehouses and sales offices across the country—assure you uninterrupted service from a dependable source of supply. DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

DIAMOND CHEMICALS

Diamond Chromic Acid

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 322.

L—308. House Organ—The third issue of the "Plastics Weldor and Fabricator," a bi-monthly external house organ published by the American Agile Corporation, Maple Heights, Ohio, is now available.

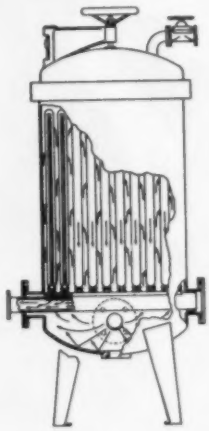
L—309. Case History—A new Case History Report, Number 31, detailing the handling of malleable iron castings by a leading New England foundry, has just been released by The Elwell-Parker Electric Company, Cleveland, Ohio.

L—310. Automatic Valves—Hydraulic valves, solenoid controlled and panel mounted, are illustrated and described in the new Rivett Catalog No. 261 just published by Rivett Lathe & Grinder, Inc., Boston, Mass.

L—311. Lifts—Its new line of multi-purpose, manually propelled, hand and battery-powered hydraulic lifts with capacities from 500 to 2000 lbs., are illustrated and described in a new eight-page brochure, just released by The Oster Manufacturing Company, Wickliffe, Ohio.

L—312. Roofing and Siding—A new, revised six-page brochure on V-Corr, a corrugated porcelain enamel on steel roofing and siding, is now available from the manufacturer, the Toledo Porcelain Enamel Products Company, Toledo, Ohio, a division of the Bettinger Corporation. The brochure describes the maintenance-free and corrosion-resistant properties of V-Corr. In addition, it gives complete engineering data, details of sheets and flashings and methods of installation.

L—313. Vertical Filters—A number of new devices to increase filtering performance and convenience are now available on Industrial's Vertical Filters for chemical and water purification. Filter leaves that



New Industrial filter with bottom outlet and lift out leaves No Bolts

can be lifted from the manifold without unbolting, bottom and top outlet leaves, quick opening cover, jacketed shell, bottom opening filter chamber, and individual leaf outlets are described and diagrammed in a new 8-page folder. In addition to a full description of the vertical filter line, the literature also details air wash, sluicing and shaking devices. Bulletin 111.

L—314. Shuttle-Drive Conveyors—A new 4-page bulletin issued by the Industrial Filtration Company on Delpark Shuttle-Drive Conveyors for all material handling gives complete technical details on this new type oscillating conveyor for industrial applications.

L—315. Be-Cu Dies—An all-new four page folder on the subject of Beryllium Copper Dies is now available from The Beryllium Corporation, Reading, Pa.

Five separate subject headings are covered in the new literature: (1) Plastic Molds and Dies (2) Forging Dies (3) Steel Forming and Draw Dies (4) Titanium Forming and Draw Dies (5) Zinc Die Casting Dies.

L—316. H_2O Clarification—Graver Water Conditioning Co., New York, now has available a new technical reprint T-138, on the important operating factors and the selection of chemical treatment for water clarification. This highly informative article not only discusses the theoretical chemical problems of coagulation, but also goes into the actual physical consideration of the process.

Graver's Technical Reprint T-142, which discusses the details of dealkalization, a new method of alkalinity reduction

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THERM-X
IMMERSION HEATER
BUILT-IN CONTROL...
for FAST,
LOW COST,
OPERATIONS
• CORROSION RESISTANT
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• LENGTHS FROM 12" to 48"
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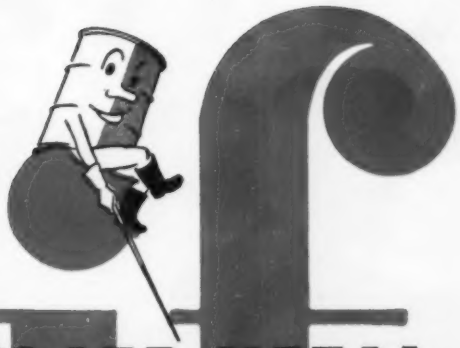

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- YOU PLATE METAL
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- YOU WELD ALUMINUM
- YOU STRIP ORGANIC FINISHES

NORTHWEST'S CHEMICALS DO IT BETTER!

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Northwest's Metal Cleaning Specialists have at their command such outstanding processes as LO HI pH — for cleaning prior to plating, painting or vitreous enameling; ALKALUME — for preparing aluminum for finishing and spot welding; INTERLOX — for phosphate coating; SPRA-LUBE — to control overspray of "todays" paints in water-wash paint booths; PAINT STRIPPERS — specific to your needs; SUPER-DRAW AND FLUID FILM — for drawing metals.

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These are Federated's exclusive Conducta-Core anodes, the most economical lead anodes for modern chromium plating operations.

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TRADE ~ LITERATURE

is also available. This process, also known as sodium zeolite-anion exchange, has the special advantage of not requiring corrosion resistant equipment. Yet, alkalinity is removed, as well as hardness, by a simple, efficient method.

In addition, Technical Reprint T-143 is now available from Graver Water Conditioning Co.

This case history discusses the method used to obtain water re-use and metal recovery and the dollar savings realized after the system was put into operation. The article goes into the details of the plant operation, the design of the recovery system, the operational cycle and the benefits derived.

In addition to photographs of the equipment, there is a flow diagram of the waste treatment plant.

L—317. Hydraulic Fluid—A new, 8-page bulletin describing Houghto-Safe fire resistant hydraulic fluid has been released by E. F. Houghton & Co., manufacturers of oils, chemicals and packings.

L—318. Busway—A low-impedance feeder busway system designed for general-purpose power distribution applications where heavy loads are served or where low-voltage drop is essential is described in a new 16-page, two-color bulletin issued here by the Distribution Assemblies Department of the General Electric Company.

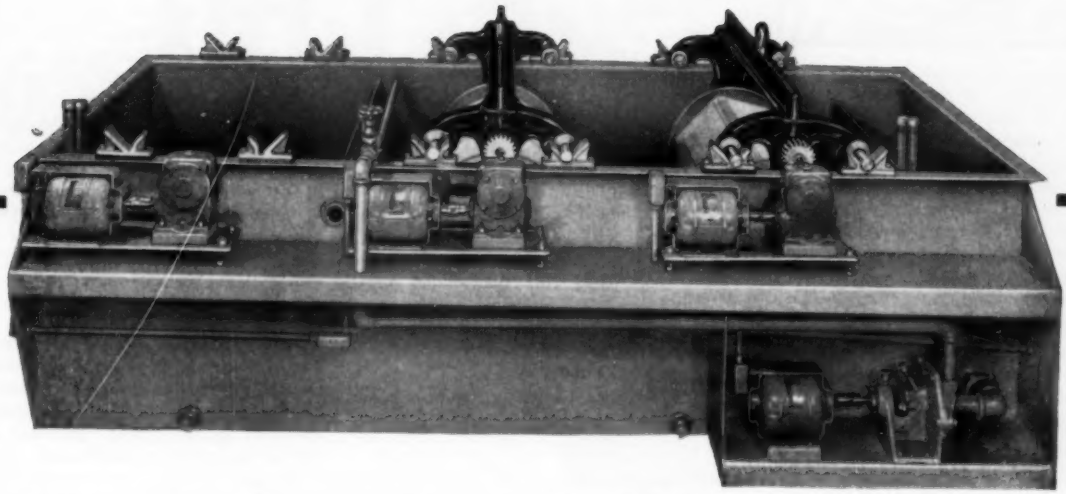
L—319. Rotary Air Pumps—New 12-page catalog No. 755 gives details of construction, dimensions, capacities and performance curves on complete line of Leiman Rotary Air and Vacuum Pumps, including 4-wing type, 2-wing type, double-cylinder type, motor-driven models, integral pump and motor, air motors and full line of accessories. Leiman Bros., Newark, N. J.

L—320. Centrifugal Pump—A new flyer describing the Centri-Chem R Type 20 stainless steel centrifugal pump on a pedestal mount for any standard motor or belt drive is available from Eco Engineering Company, Newark, N. J.

L—321. Education—Joseph B. Kushner, director, Electroplating School, Stroudsburg, Pa., makes available a reprint of an article written by himself entitled "Educating Electroplaters by Mail."

L—322. Ethylenediamine Tetraacetic Acid—Geigy Industrial Chemicals of New York make available a Sequestrene (ethylenediamine tetraacetic acid) Bibliography (1953–1954).

STUTZ



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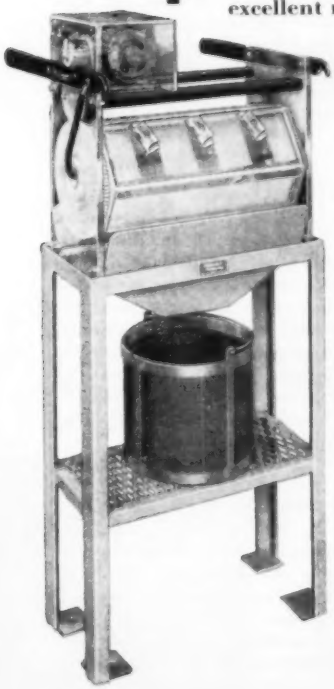
for heavy duty—high speed production

Stutz design in single or multiple units with or without rinsing compartment. Solution circulating pump for rapid elimination of surface grease into trap from which complete removal made by draining of trap compartment daily.

Rotation of work in cylinders together with solution agitation of pump, provides complete cleaning in a single operation.

Cylinder drive and pump motors are 1/3 h.p. 440-220-3-60 with heater type motor control switches. Plate or pipe coils installed.

With this type of equipment, vapor degreasing is not required. Can also be furnished for electrolytic cleaning and P. R. current will do excellent removal of heavy furnace scale, rust, etc.



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Standard openings	3/32″
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Perforated Metal	$9.15
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- The Stutz Portable Barrel is made in 2 standard sizes with cylinders having inside dimensions of 6″ x 12″ and 8″ x 18″, I. D., and smaller upon application. Standard openings are 3/32″. Smaller or larger openings can be furnished as required.
- Baskets in perforated metals or wire mesh.
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L—323. Localized Plating—Reprints are available of articles describing The Dalic Process of selective electroplating. These articles, including photographs and tables, give a complete description of this revolutionary process, including a description of the metallurgical characteristics of the plate; the chemical characteristics of the solution; the equipment needed; the method of operation and a partial list of major applications of the process.

L—324. Motion Picture On Metals Finishing—Bart-Messing Corporation of Belleville, N. J., announces the completion of an educational motion picture with sound, dealing primarily with the electroplating facet of metal products finishing.

Entitled "A Brighter Tomorrow" this 16mm technicolor film which runs approximately 30 minutes, visits the various plants of the Bart-Messing Corporation where a number of interesting metals finishing processes and applications are observed and described.

The manufacture of Sel-Rex Rectifiers and Double Duty Filters for the Electroplating Industry is followed from the drawing board to the finished product. Scenes taken in the laboratories of Sel-Rex Precious Metals, Inc., an affiliated company, show some of the meticulous procedures employed in the preparation of precious metals salts and solutions for the Electroplating Industry.

"A Brighter Tomorrow" gives a panoramic view of the Electroplating Industry's contribution to our country's security, welfare and comfort; from the anti-corrosive electrodeposits of nickel on airplane propellers, steel sheets and pipes and fittings, to the functional or decorative electroplating of gold, rhodium and silver on electrical or electronic components, jewelry and various household articles.

A print of "A Brighter Tomorrow" is available free of charge to qualified organizations for showing at sales meetings, conventions, educational seminars, or any public gathering interested in the vital Electroplating Subdivision of the Metals Finishing Industry.

L—325. Metal Cleaning Equipment—The basic line of Circo degreasers for metal cleaning is presented in a 4-page condensed catalog prepared by Circo Equipment Company, Rahway, N. J. Standard and special apparatus for handling practically every type of grease or dirt removal problem in either manual or conveyor operated systems are fully outlined and illustrated in Circo's descriptive bulletin 521.

Among the units covered are vapor phase, vapor spray, liquid vapor, pit type and mechanized models which are designed for broad, all-inclusive use by the metal working industry. Design features, an explanation of operation and application information on each type is contained. Also included is data and capacity figures on the Circo solvent recovery still, general information on single or multi-stage power spray washers, an item on portable hydro-spray cleaners and facts about degreasing solvents available through Circo.

L—326. Annual Review of Zinc Industry—"A Review of the Zinc Industry in 1955," a new 13-page booklet, has been published by The American Zinc Institute, Inc., New York, N. Y. A copy of the booklet may be obtained without charge.

L—327. Continuous-Cast Bearing Bronzes—Asarco's new 5 to 9-inch diameter Asarcon 773 Continuous-Cast Bearing Bronze (SAE 660) and the savings accurring in factory maintenance and production by virtue of the unique advantages the product offers in length, size, machining time, metallurgical superiority, and physical properties are described in 6-page Bulletin No. 301, just issued by the Continuous-Cast Products Department of American Smelting and Refining Company, Perth Amboy, N. J.

L—328. Ultrasonics for Industry—A new and comprehensive 8-page bulletin covering application of the ultrasonic Reflectoscope for non-destructive testing of products and equipment, has been published by Sperry Products, Inc., of Danbury, Conn. The bulletin is of interest to executive, technical, production, and maintenance personnel in almost every phase of American industry.

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Cowles QC Cleaner gets under the soil—even where pressure spray jets won't reach—wets the soil thoroughly—pries it loose—disperses and emulsifies loosened soil.
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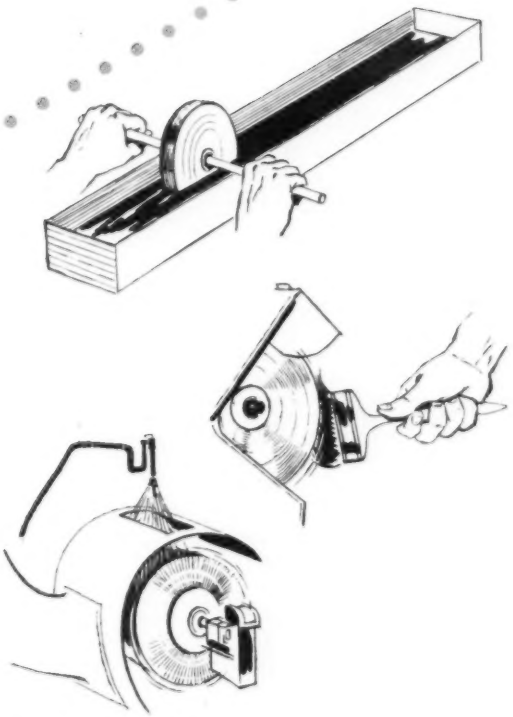

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a flexible liquid abrasive polishing composition carrying the finer grit sizes.

LEA PLASTI-GLUE · · ·

a flexible liquid adhesive for setting up polishing wheels.

The marked success of LEA LIQUABRADE in *liquid* buffing operations led our technical staff straight into the important field of polishing and burring with liquid compositions. First came LEABRAMENT designed for liquid polishing operations in the medium to coarse grit range.

Now, we are announcing LEA PLASTI-BRADE and LEA PLASTI-GLUE, both designed for use with the finer grits for flexible polishing operations. PLASTI-BRADE is a non-flammable, stable, non-settling *liquid* polishing composition with grits ranging from 120 to 320. PLASTI-GLUE, also non-flammable and stable,is a liquid adhesive for setting up polishing wheels in the finer grit sizes. Both liquids can be sprayed, brushed or rolled. Both come in 30 to 55 gallon drums, 5 gallon pails, or gallon cans. Place a trial order today for enough to make a thorough test. If you want our recommendation as to proper grit sizes, etc., write in detail about the kind of work involved, operational steps, and end-finish desired.

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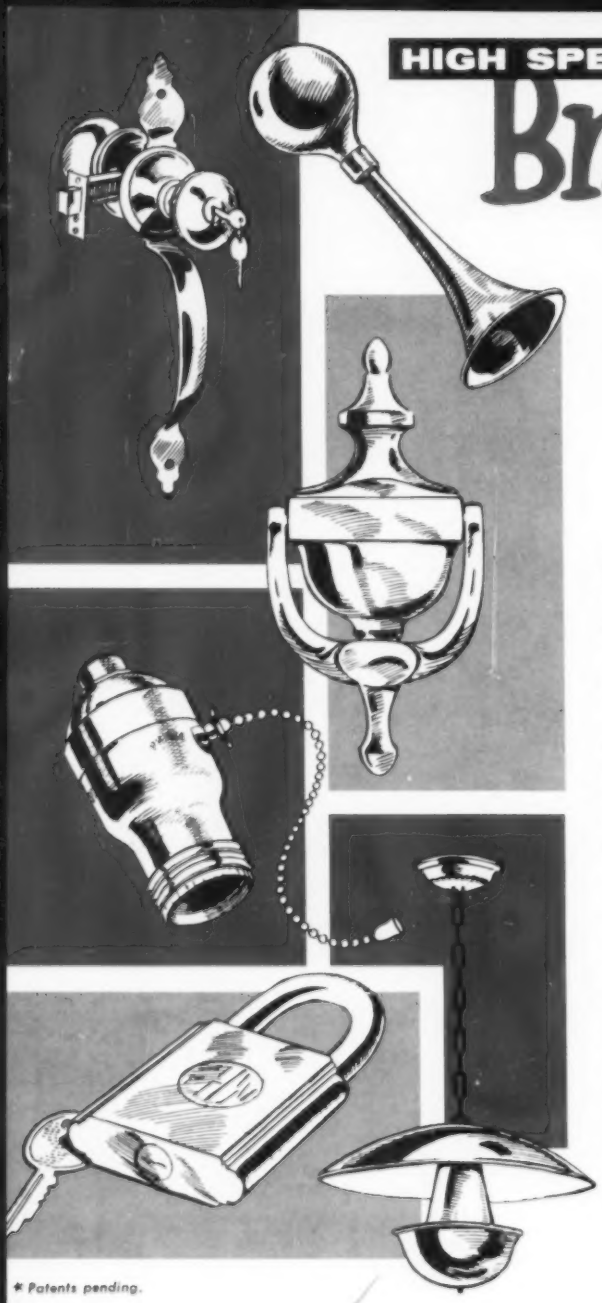

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* Patents pending.

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frame rotated by a rack. As the frame rotates at 5-rpm, each filter box is filled, and the material is filtered, washed in successive counter-current steps and sucked dry. Then the box is tipped over so that the cake drops out.

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ALUMINUM—(99% pure plus ingot)	24.40¢
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85–5–5–5 (Ingot $.115)	42.00¢
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88–10–2 (Ingot $.210)	58.25¢
Manganese Bronze ($.421)	37.75¢
CADMIUM—Platers' shapes	$1.70
CHROMIUM—Electrolytic (99.8%) 0.2 Fe; ton	$1.27
COPPER—Electrolytic, domestic	43.00¢
Custom Smelters' Price	52.00¢
Refiners' Cu Scrap ($.1)	42.50¢
INDIUM—(Per Troy oz, commercial 99.97%)	$2.25
IRON—Pig (per gross ton—2,240 lbs)	$54.50–62.00
Scrap	$38.00
LEAD—(Common) New York	16.00¢
St. Louis	15.80¢
MAGNESIUM—(Ingot F.O.B. Newark)	34.70¢
(Sticks 1.3 in diameter, 100 lbs or more)	53.00¢
MERCURY—(Per 76 lb small quantities)	$270.00–274.00
NICKEL—Electrolytic Cathodes (sheets loose)	64.50¢
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Selling price, Government owned silver (F.O.B. San Francisco +1.25¢ transportation)	91.00¢
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Special Hygrade (delivered)	15.25¢
Die casting alloys	18.00–19.00¢

Revised specifications and tests for electrodeposited metallic coatings Free, (through the courtesy International Nickel Co.)

STANDARDS RELATING TO ELECTRODEPOSITED METALLIC COATINGS

A 164 – 55.	Spec. for Electrodeposited Coatings of Zinc on Steel
A 165 – 55.	Spec. for Electrodeposited Coatings of Cadmium on Steel
A 166 – 55 T.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Steel (Tentative)
A 219 – 54.	Methods of Test for Local Thickness of Electrodeposited Coatings
B 117 – 54 T.	Method of Salt Spray (Fog) Testing (Tentative)
B 141 – 55.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Copper and Copper-Base Alloys
B 142 – 55.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Zinc and Zinc-Base Alloys
B 177 – 55.	Rec. Practice for Chromium Plating on Steel for Engineering Use
B 183 – 49.	Rec. Practice for Preparation of Low-Carbon Steel for Electroplating
B 200 – 55 T.	Spec. for Electrodeposited Coatings of Lead on Steel (Tentative)
B 201 – 55 T.	Spec. for Chromate Finishes on Electrodeposited Zinc, Hot-Dipped Galvanized, and Zinc Die-Cast Surfaces (Tentative)
B 242 – 54.	Rec. Practice for Preparation of High-Carbon Steel for Electroplating
B 252 – 53.	Rec. Practice for Preparation of Zinc-Base Die Castings for Electroplating
B 253 – 53.	Rec. Practice for Preparation of and Electroplating on Aluminum Alloys
B 254 – 53.	Rec. Practice for Preparation of and Electroplating on Stainless Steel
B 281 – 53 T.	Rec. Practice for Preparation of Copper and Copper-Base Alloys for Electroplating (Tentative)
B 287 – 54 T.	Method of Acetic Acid-Salt Spray (Fog) Testing (Tentative)

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REPORTS FROM ALL OVER . . . STRIPPED, CLEANED

The measure of the value of all goods and services produced is close to the $400 billion-annual-rate. . . . Total production this year will come close to matching '55's tremendous output. . . . Total business inventories reached $4.4 billion last year. . . . There will be little change in the remarkable stability of prices that has prevailed in the last three years. . . . The chemical industry is doing far more basic research than any other US industry, according to the **Natl Science Found.** and also employs more scientists and engineers than any other branch of industry. Basic research is the "pump primer" which makes applied research possible and is the "keystone to further progress," according to *J. Hull,* **Mfg Chemists Assn,** who added that many in the chemical industry believe that industry should be intensifying its own basic research activities. . . . Since WW II, private industry spent $11.3 billion for scientific research; and, today, about 5,000 privately-owned industrial organizations employ 300,000 scientists, according to *P. Schwarzkopf,* **Amer Electro Metal Corp.** . . .

A plant to make liquid aluminum sulfate will be built at Hopewell, Va., by **Allied Chem & Dye Corp.** . . . A truck-mounted water purification unit which can make radioactive water safe to drink in 30 min was said to have been developed by **Army Engineers** at Ft Belvoir, Va. It is claimed to eliminate water contamination even though the enemy used his whole range of chemical, bacteriological and radiological methods. Put together by 3 men in less than 90-min and operated by 1 man, it can turn out 3,000-gph from the most polluted stream in the world. . . . Color-tinted, rust-inhibiting paint undercoats, based on calcium plumbate combine high covering power with increased opacity and exceptional rust inhibiting powers, according to **Atlas Preservative Co,** England. . . . Water clarification with anthracite—filter beds made up of different sizes of anthracite coal have proved economical and efficient and
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duplicating wheel formulations. . . . A m
with nickel or chromium reportedly
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parts from galling easily under frictio
equipt by **GS Equipt Co,** Clevelan
suspension-drive which eliminates trans
bearings. The two 12-inch long, self-c
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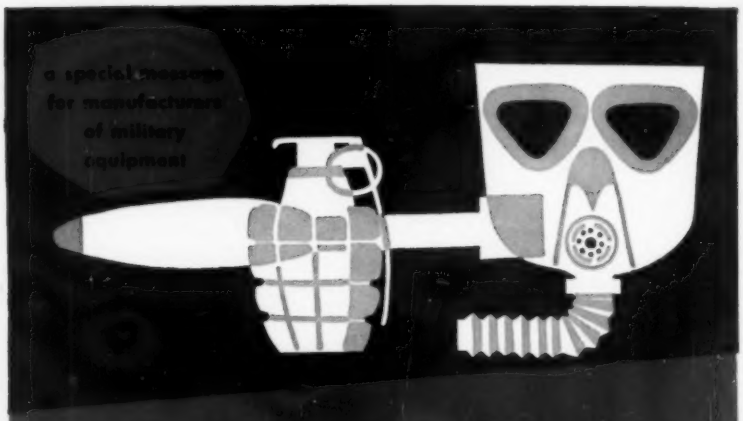

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ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

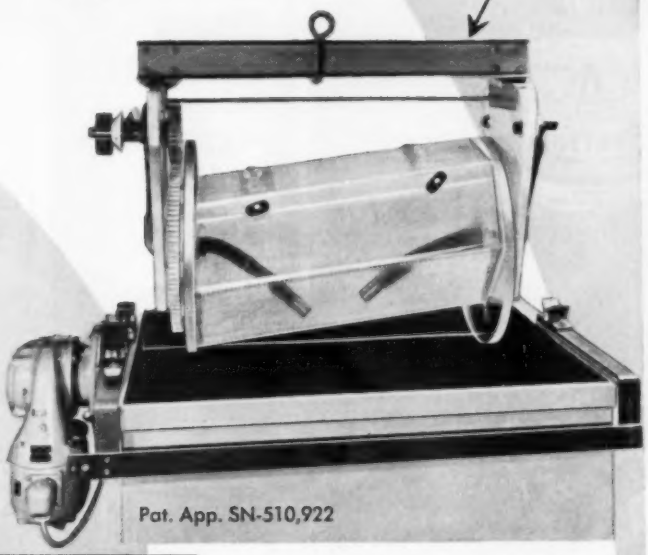
ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.

Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ANF Plating Chemicals, Anodic Alloy 27 Lacquers, A-R-P Products Co.

BELKE DOUBLE OSCILLATION

Improves Plating Quality
Reduces Plating Time
Cuts Plating Cost

Eccentrically mounted cylinder oscillates as it rotates



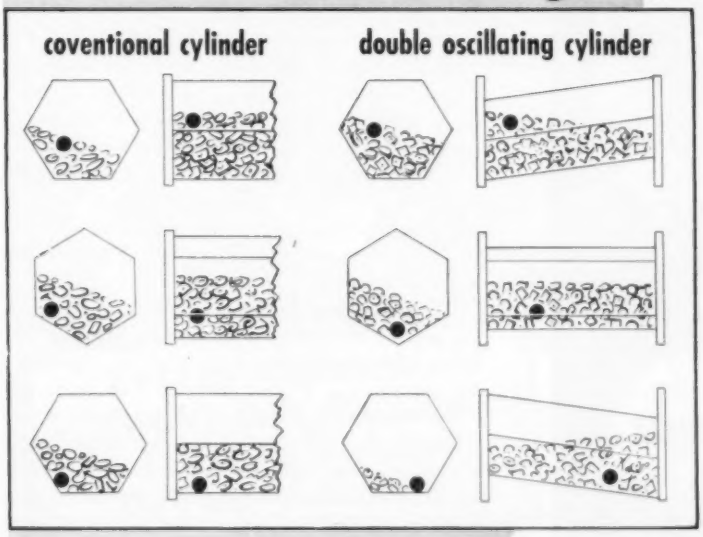
Pat. App. SN-510,922

Why!

Because the parts move up and down, back and forth, round and round. All faces are exposed. You get a specified thickness on all surfaces in less time.

See the difference

The diagrams below illustrate the difference in mixing action. The black spot represents a marked piece in the work.
Note how the black spot moves round and round in the conventional cylinder.
Then note how the black spot moves both around and across in the Double Oscillating Cylinder.



Mixes work the way a plating cylinder should

When you see this new multiple mixing action you'll agree it's the way a plating barrel should work and want no other kind.

Fortunately, all the new multiple mixing action comes from the cylinder. You can get wonderful improvement using the new cylinders with present equipment, but complete barrels designed throughout for double oscillation give even greater benefits.

See your BELKE Service Engineer or send for literature.

BELKE Double Oscillating Cylinders are available in all sizes from 14x30 regulars to 6x12 portables.
Order a double oscillating cylinder for your hard to plate jobs. See the great improvement in plating quality and big saving in plating time.

Belke Manufacturing Company
947 N. Cicero Ave., Chicago 51

EVERYTHING FOR PLATING PLANTS

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 329.

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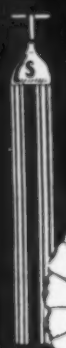
'The COMPLETE Line!'

Lime · Stainless · Tripoli
Grease Stick · Aluminum

Bar Compounds -
In any size and shape

Cold Polishing
Wheel Cement



7 Assorted Anodes
Assorted Hooks

Buffs - A complete assortment

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Schaffner manufacturing company, inc.
SCHAFFNER CENTER, EMSWORTH, PITTSBURGH 2, PA.

Send me free samples on the following:

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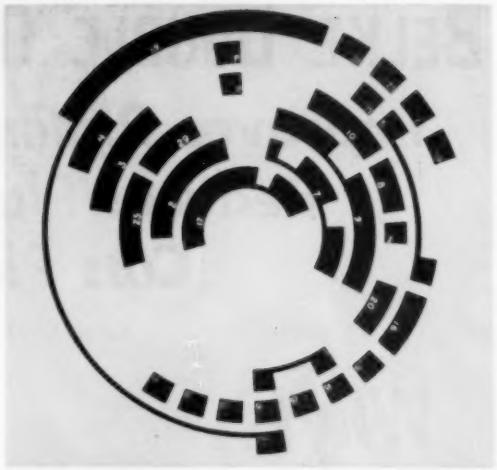
Name_____ Title_____
Company_____
Street_____
City_____ Zone_State____



Heavy Rhodium—Rhodium as a protective finish for jewelry has been widely used for the past 25 years. However, the value of Rhodium when applied to industrial problems, was recognized during World War II when heavier than normal deposits, (1 to 2 mg/in²), were used on radar and microwave devices.

The extreme hardness and excellent electrical characteristics of Rhodium made it a "natural" for sliding contact members. Also, because of its hard nontarnishing nature it found use in devices where extremely light contact pressure and very long shelf life were required.

A very important and increasing application for Rhodium is in printed circuits. The details of this process have been worked out to a high degree of perfection by Sigmund Cohn Mfg. Co. engineers. Deposits of 10–20 mg/in² for printed switch parts are generally applied. Less can be used where corrosion resistance is the only requirement.

A former difficulty experienced by earlier attempts in this field of rough or feathered edges has been completely eliminated. A fine, smooth boundary of the plated area with virtually no loss of fine line detail is now assured.

Reproduction of this printed circuit posed interesting production problems in printing. The engraver, (Newark Photoengraving of Newark, N. J.) accepted the assignment in a spirit of—"we'll try anything."

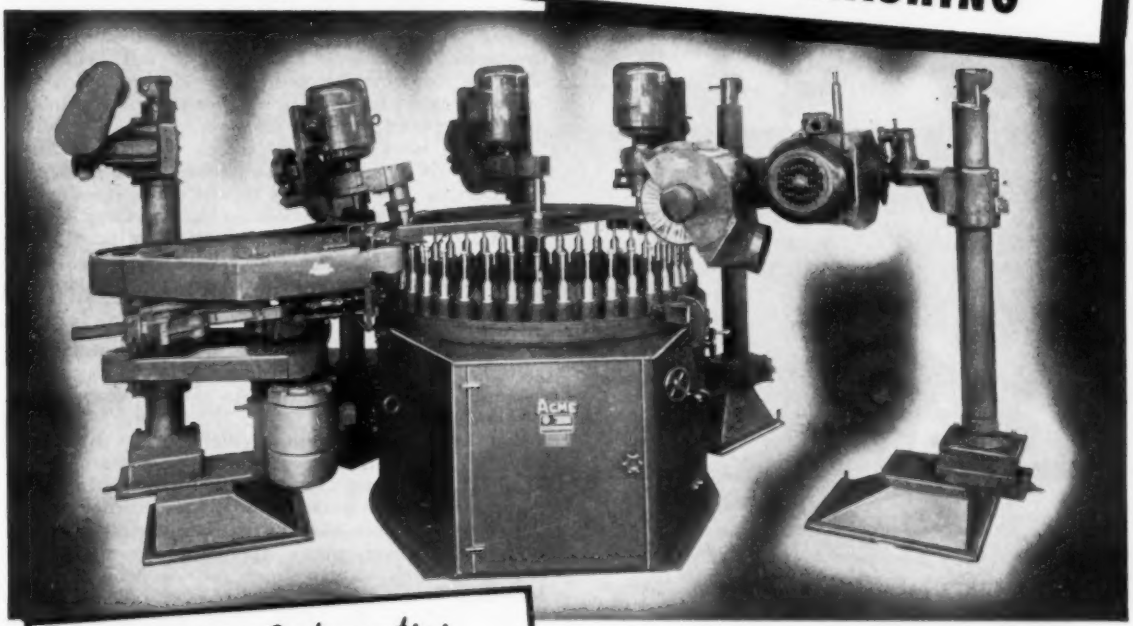
Discarding normal methods of reproduction and on noting that the circuit image was raised a few thousandths of an inch, they put the circuit on a printing press and actually printed from the circuit onto paper with black ink. From there on it was processed in a usual manner to achieve the reduced size reproduction shown above. We salute the ingenuity of our engraver for the fine reproduction achieved.

We salute, also, the Sigmund Cohn Mfg. Co. for the excellence of the work itself. So accurately is the plate applied, so cleanly, and so evenly, that a fine print was possible from the surface itself. Note the detail of the numbers on each contact.

ACME *Automatics*
OFFER THE SOLUTION to MANY PROBLEMS of
PRODUCTION FINISHING

Production finishing demands not only high output at low unit cost, but also a uniform finish meeting required standards. Acme Automatics can be depended upon to deliver high production at minimum cost and maintain your finish requirements. Acme performance has been proved in production for nearly half a century.

POLISHING and BUFFING
DE-BURRING
WIRE BRUSHING
MICRO-FINISHING



ROTARY *Automatics*
STRAIGHT LINE *Automatics*
SEMI-*Automatics*
Catalogs on Request

Recommendations & Quotations

For recommendations, send blue prints of part or samples before and after finishing operations, together with detailed information on finishing operations and production requirements. If production methods will cut your costs, we can set your job up in our experimental processing department and you can inspect the machines in operation.

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

FOR FURTHER INFORMATION, USE READER SERVICE CARD: INDICATE A 331.

HAVE YOU HEARD ABOUT THIS EXTRAORDINARY CLEANER?

It saves money in paint shops!

Oakite Rustripper is an alkaline material that strips paint, pigment residues and phosphate coatings at the same time that it removes rust and oil.

It saves money in plating shops!

Oakite Rustripper removes rust or heat scale at the same time that it removes oil and other soils. It avoids hydrogen embrittlement, damage to machined surfaces and other disadvantages of acid pickling.

FREE

For more information about how Oakite Rustripper eliminates operations in paint shops and plating shops, send for one or both of the illustrated booklets listed in the coupon.

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COVER STORY

A Rose Is Rhodon Is Rhodium

When Mendeleeff in 1870 first expressed the law of periodicity only 63 species of chemical atoms were known. Large errors existed in the determination of some of the atomic weights. Atomic numbers were later found to be more fundamental than atomic weights. Nonetheless, those early Mendeleeff charts were able to predict the properties of elements as well as the functions and properties of their compounds. Since 1870, numerous charts have been worked out based on periodicities.

The portion of the chart which appears on the cover this month was compiled by the late Henry D. Hubbard while he was with the National Bureau of Standards. The chart shows 33 different fundamental properties and characteristics of the atoms, including nature, structure, behavior and history.*

Also widely used in science and technology, in the training of new researchers and scientists, is the Fisher Simplified Periodic Chart of the Elements. This one lists only the important and basic information concerning each element: the symbol, atomic number, atomic weight and group of each element, and the maximum orbital electron distribution for each period. Many arrangements have been made to suit specific purposes. Dr. Abner Brenner, in a talk before the Newark Branch, projected a copy of a periodic chart which brought together in a logical periodic sequence all of the plating metals.

In this issue, Rhodium is the element of focal interest. It is for this reason that on the section of the Periodic Chart printed on the cover Rhodium is permitted to sparkle. Rhodium has an atomic weight of 102.91; atomic number 45; melting point 1985 degrees C; specific gravity 12.5; valence 1, 2, 3, or 4. It was discovered by Wallaston in 1803. Rhodium is a silver-white metal of the platinum family. It occurs with other members of this family in river sands in the Urals and in North and South America. The salts form red solutions. In electroplating it yields a surface not affected by exposure to air or strong acids or alkalies.

Until recently, Rhodium's chief use was in jewelry and a few other varied applications. World War II, however, brought about an increased demand for its use in radar and other electronic parts. This constitutes one of its most important applications today. However, many applications are also encountered such as Rhodium mirrors where, when Rhodium is deposited on glass, gives a reflecting surface with no distortion. (See July 1955 cover.)

Interest in Rhodium is on the increase as more is learned about it. In that July issue of PLATING, Dr. Edward A. Parker of Technic, Inc. had an authoritative article, "Electrodeposition of Rhodium." The cover of the same issue was made from a rhodium mirror manufactured by Sigmund Cohn Mfg. Co.

In this issue is included "Further Studies in Heavy Rhodium Plating" by Dr. Wiesner and Harold Meers, both of Bendix Products Corp.

The editors wish to thank the Fisher Scientific Co. for permission to use the chart in the manner in which we have on the front cover. *The Editor*

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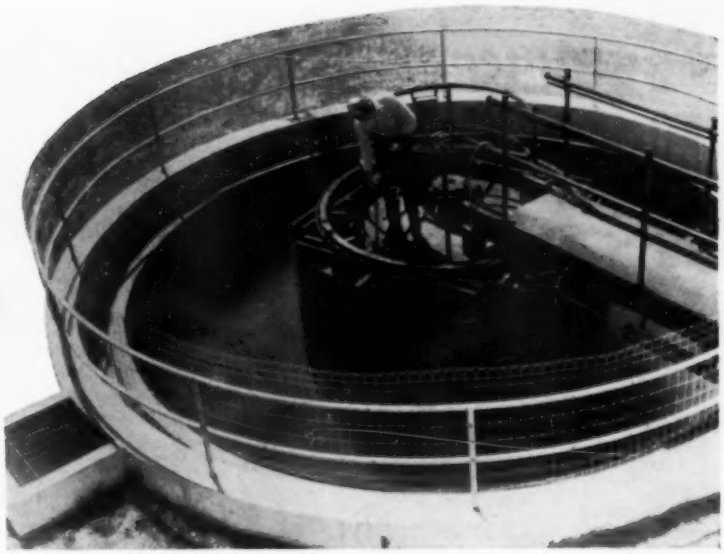
† *Rhodon is the Greek word for Rose. "Rhodium" was derived from this word. It may have been inspired by the red color of rhodium salt solutions. It would be nice to believe that as a rose is considered the king of flowers so too was Rhodium named as a king of metals.*

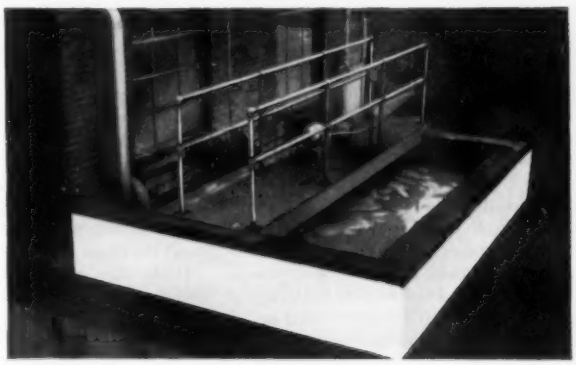
* *It is published by W. M. Welch Scientific Co. and is available from Fisher Scientific Company and other laboratory supply firms.*

Disposal of metal finishing wastes—as easy as 1-2-3!



1. CYCLATOR® Clarifier: A high-capacity unit for removing metals, soluble oils and suspended solids, and for pH adjustment.

Treatment of pickle liquors, detergents, plating solutions, coolants and rinse waters is rapid and economical when you use INFILCO equipment. One or more of the units shown here will provide a permanent solution for your waste disposal problem.



2. VORTI-MIX® Circulator: For primary treatment of plating wastes which contain chromates and cyanide. Also applied to pickle liquor neutralization and cracking of oil emulsions.

3. PRIMARY CLARIFIER: For recovery of oil and removal of settleable solids when two stage treatment is required.

The proven success of this equipment in the metal finishing industry is your assurance of satisfaction. See your consulting engineer or write for complete information.

INFILCO INC.
933 South Campbell Ave.,
Tucson, Arizona
Offices in principal cities in North America

INFILCO

The one company offering engineered equipment for all types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

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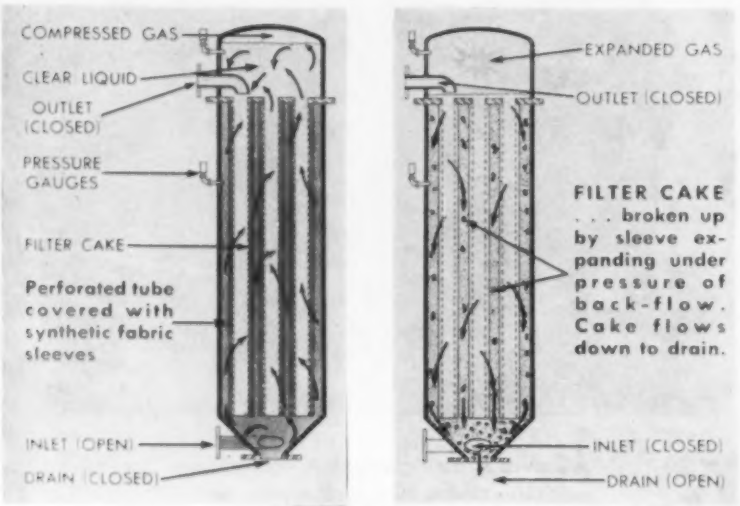
Equipment and Supplies...



Rapid Self-Cleaner

E—329. Unusual Filter—Industrial's Hydra-Shoc is a tubular filter useful for any water or chemical purification task. It builds up air pressure at the end of the filtering cycle and uses the pressure for a sudden back-surge to clean the filter. No extra devices are used, the filter shell itself acts as the pressure chamber and the arrangement of regular valving provides the controls. The Hydra-Shoc eliminates the use of filtered water for cleaning and the need for back flow pumps. Operating vertically, it takes very little floor space. This design provides highly efficient, convenient filtration at a relatively low price.

The Hydra-Shoc follows the usual operation pattern for tubular filters. The influent passes through the walls of perforated tubes covered with synthetic fabrics. Pre-coating, when needed, is done in the usual way.

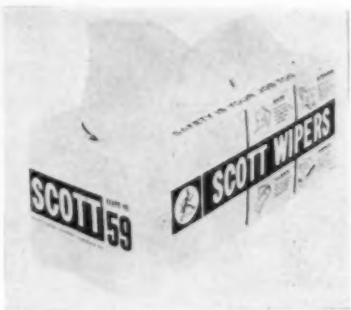
The cleaning procedure is extremely simple. The outlet valve is closed, building up pressure on the entrapped air, then a pair of quick opening valves simultaneously shut off the inlet and open the drain. The compressed air instantly causes a violent back-surge that expands the tube covers, dislodges the filter cake and forces it out the drain in a matter of seconds.

Hydra-Shoc Filters are built to ASME Construction Code in a wide range of materials with lined or unlined chambers.

For full details ask for Bulletin 114.

E—330. Phosphate Material—A new and highly efficient phosphating material known as "Metacote" has been announced by Metasurf Corporation, Detroit, Mich. It is adaptable to both spray washer and immersion tank processes and creates a fine, even, tightly adherent coating which assures exceptionally good paint adhesion and salt spray resistance. Although it is normally used for treating steel, it is also effective on aluminum and zinc die cast metals. An outstanding characteristic claimed for Metacote is that no special additive or secondary material is required in order to produce consistently good results. Concentrations of the solutions are controlled through a simple titration and for which a test kit is furnished.

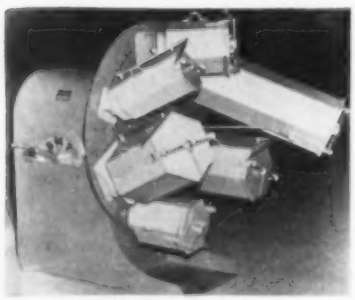
E—331. Safe, Strong, Clean, Handy Wipers—Now available to American industry, in the newly designed carton shown,



For Industrial Wiping—in Two Sizes

is the popular disposable industrial wiper recently developed by Scott Paper Company, Chester, Pa. This identical wiper, only in a smaller size, can also now be obtained by industrial firms through their regular paper jobber. Both products contain 125 wipers in each box, with 18 boxes to a case. Distribution is national.

E—332. Showpiece—Metal surface finishes as fine as the proverbial "cat's whisker" will be demonstrated as part of



Up to 25 Barrels in 4 x 4 Space

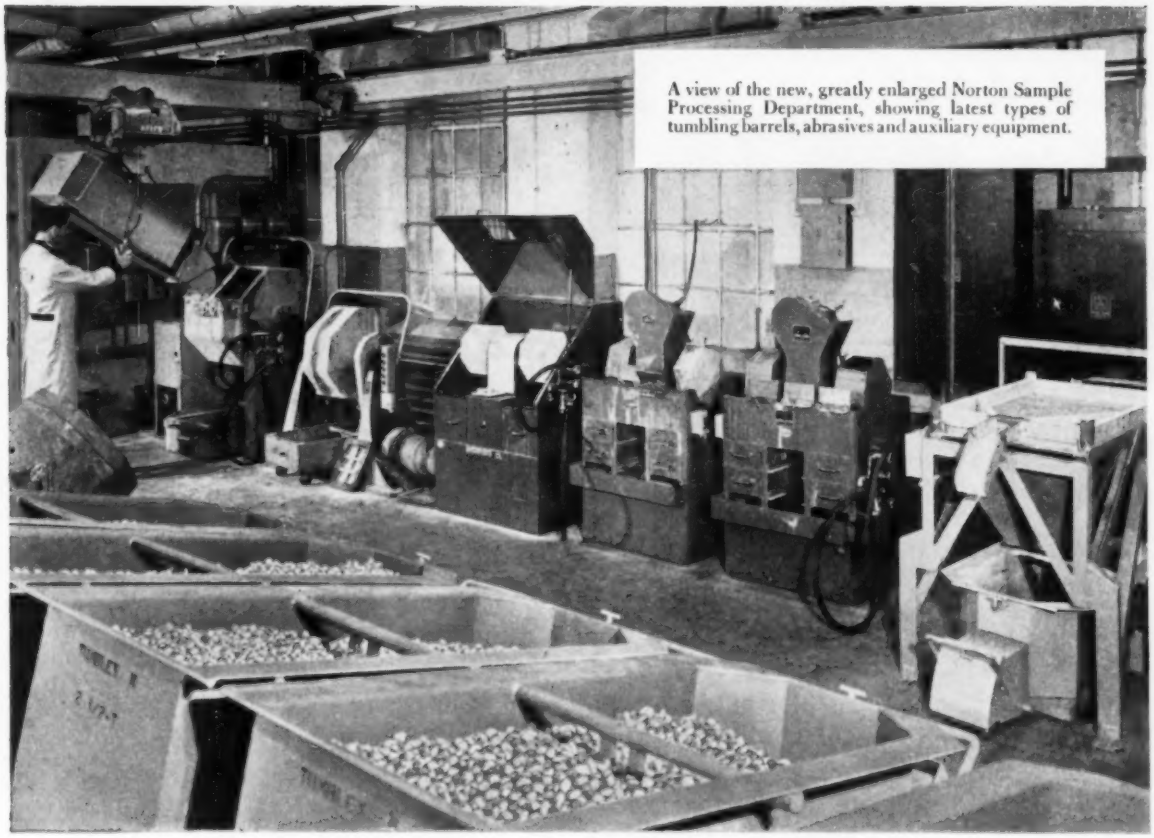
the ASTE display exhibit of the BMT Manufacturing Corp. of Elmira, N. Y., manufacturer of the BMT Multi-Barrel SlideHoning finishing units. Located in Space 709, BMT will show metal and plastic parts of all shapes and sizes currently being finished by barrel tumbling with savings in costs amounting to hundreds of thousands of dollars over ordinary hand finishing methods used in some industries.

On display for the first time will be the latest model BMT Multi-Barrel SlideHoning machine, a modern precision tumbling unit with controlled-motion honing that does not affect dimensional tolerances of parts, yet removes burrs, flash, tool marks, rust, paint, plating, and heat treating scale, and contributes to finer microfinish and color of metal. In addition, rounding corners, cleaning fillets, and blending chamfers can also be done successfully on a variety of work pieces at the same time and on the same machines without mixing, either wet or dry. Up to 25 barrels can be mounted on the BMT SlideHoning unit with a range of mountings, barrel sizes, linings, and shapes.

Also on exhibit will be a complete representation of barrel finishing compounds for use in all stages of finishing operations, ranging from heavy deburring to microfinish burnishing and cleaning, rinsing, and anti-rusting.

Barrel finishing media for use with compounds will complete the exhibit. Zinc die cast Polishapes along with a wide variety of natural stone, ceramics, and abrasive grits in several sizes and shapes will be demonstrated for various finishing operations.

The BMT exhibit will provide visiting tool engineers a new perspective on finishing parts previously considered impractical for barrel finishing methods.



A view of the new, greatly enlarged Norton Sample Processing Department, showing latest types of tumbling barrels, abrasives and auxiliary equipment.

Find out what barrel-finishing can do for you

Make the Norton Sample Processing Department your proving ground for faster, lower cost production methods

If you're still finishing metal parts the long, hard, expensive way — with out-of-date tumbling or off-hand methods — here's your chance to find out how you can improve product quality and cut production time and costs.

The newly enlarged Norton Sample Processing Department puts at your disposal the very latest advances in barrel finishing — including equipment, abrasives and techniques.

Perhaps you'd like to speed up your deburring or descaling operations. You may have complicated parts. You may want to get a better color on your finish, or a lighter cut on die castings so as not to cut under the smooth outside surface.

Whatever your finishing problems, just send us sample parts — and they can range from tiny needles to hefty forgings. Without charge or obligation Norton production engineers will find out just what tumbling will do for you. Your finished parts will be returned along with a detailed report telling you exactly how to get best results from tumbling in your plant. This includes recommendations as to barrel type, size, speed and time cycles . . . type, size and amount of abrasive media to use . . . proportion of compound or cleaner to water, and other data.

What To Send Us

Along with your unfinished parts please forward: (a) a finished sample to be matched (hand-finished if necessary); plus (b) information on your present barrel finishing equipment, if any, including type and size of barrel and speeds. Address the Sales Engineering Department, Abrasive Division, NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

G-300

NORTON ABRASIVES

Making better products... to make your products better

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

NOW Low Prices on G-E Automatic Make "Automatic Savings" Available to

TRIM ALLOYS, INC., OF BOSTON SHOWS HOW G-E AUTOMATIC POWER SUPPLIES SAVE LABOR, SPOILAGE, AND MAINTENANCE.

Lower prices on General Electric automatic plating rectifiers now let you take a big step toward complete automation . . . at low cost.

Besides bringing within your reach the savings of automation, G-E automatic plating power supplies are designed to assure you of uniform plating.

The Trim Alloys, Inc., installation was engineered by The Chemical Corp., Springfield, Mass.

HERE IS THE REPORT OF TRIM ALLOYS, INC., which uses G-E automatic plating power supplies for anodizing aluminum extrusions: "Ours is a high quality process, yet we don't want to waste time, manpower, or materials. In order to maintain our high standards with manual control, we would need a man on the controls all the time. With G-E automatic control, however, we free our operators for other work . . . and get much better control, too. We simply push the start button and the unit seeks its own best setting for that particular load, shutting itself off at precisely the same interval each cycle."

Progress Is Our Most Important Product

GENERAL ELECTRIC

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 335.

COMPARE THE PRICES OF THESE LARGER UNITS

24-volt, 4000-ampere unit with automatic anodizing control—$8860*

9-volt, 10,000-ampere unit with automatic voltage control—$10,080*

24-volt, 3000-ampere unit with automatic anodizing control and sealed, oil-cooled stacks——$8380*

** Manufacturer's suggested user price.*

Plating Rectifiers Every Plating Shop

AN INCREASING NUMBER OF PLATING SHOPS are discovering that G-E plating power supplies with automatic control cut plating costs in three big areas:

1) LABOR—No one needs to stand by the controls to adjust for changes in the tank load. Plating operators can be freed for other operations.

2) SPOILAGE—Spoilage is reduced, since deposition is kept uniform by the constant current or voltage. This reduction in spoilage means fewer rejects . . . less re-working expense.

3) MAINTENANCE—Maintenance is kept low, because both the G-E automatic control and rectifier are mechanically static. Except for the cooling fan, there are no moving parts.

BEFORE YOU BUY ANY PLATING RECTIFIER, check G.E. for the three types of automatic regulation available: (1) voltage, (2) current, and (3) anodizing.

For full details, contact your G-E plating agent, or send in the coupon.

UNIFORMLY ANODIZED EXTRUSIONS are removed from the tank at Trim Alloys, Inc. Automatic control assures uniform, high-quality anodizing every time, resulting in fewer rejects.

THE DESIRED ANODIZING SEQUENCE is set up by the operator at the rectifier control panel. Once set, the anodizing sequence is completely automatic, requiring no further adjustment.

THE REMOTE-CONTROL STATION is conveniently located within easy reach of the operator right at the anodizing tank.

Section E463-13, General Electric Co., Schenectady 5, N. Y.

I would like to receive additional information on how I can save money when I plate with G-E automatic plating power supplies. Please send me bulletin GEC-970A.

NAME .....

COMPANY .....

ADDRESS .....

CITY & STATE .....

EQUIPMENT & SUPPLIES

E—333. New Compounds For Aluminum—New applications for cutting and coloring aluminum have been developed from the extensive line of bar and liquid buffing compounds manufactured by Hanson-Van Winkle-Munning Co.

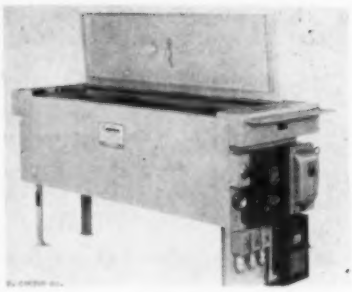
Liquid Compounds—Two liquid compounds, Liquid Tripoli 303 and 420, have proven most effective in heavy duty cutting applications, the company reports. These are now used extensively in the aluminum pot and pan industry.

The new Liquid Tripoli 728 provides excellent cut, while leaving the surface with a high clean color. This compound is particularly applicable to the appliance, storm window and automotive fields.

Bar Compounds—Several H-VW-M tripoli bar compounds meet specific requirements for cutting down aluminum, the company reports. These range from very greasy compounds for heavy duty operations to medium greasy for general purposes. For cut and color, a number of white compounds are available. Where high color is a requisite, H-VW-M recommends several of its newly-developed aluminum oxide compounds, No. 6B-168, 6B-72 and 8390. Lime-type compounds are also available for this type of work.

E—334. Tanks for Oxidizing and Dichromatizing—D. C. Cooper Co., Chicago, Ill., manufacturers of wax and plastic dip tanks, announce the development of a new oxidizing and dichromate tank for coloring steel blue-black.

Cooper's oxidizing and dichromate tanks are electrically heated and are designed to maintain correct operating temperature under thermostatic control.



Coopertank

Electric heating elements are so placed as to distribute heat evenly throughout the compound. Tank is equipped with heaters wired to provide three heating ranges depending on amount of material to be processed. Pilot lights indicate heat range in use. Tank is also equipped with automatic water control to prevent overheating of solution and to maintain solution balance.

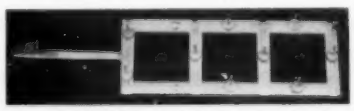
The compound chamber has scum gutter with overflow connection to remove surface scum.

A 3 inch dial thermometer gives instant temperature reading. Automatic seven day timer turns the tank on and off at a pre-set time.

These tanks are furnished in any size to meet any requirements from the smallest screws, nuts and bolts, to the largest gun parts.

E—335. Versatile Anodizing Rack—A versatile rack for anodizing aluminum and magnesium alloys has been designed and fabricated by Sidney Levine and George J. Esseff of the Materials Branch at the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va.

Made of aluminum 62S and pure titanium, it is designed to accommodate jobs requiring racks of a wide variety of sizes and shapes.



With Mobile Contact Points

The rack features mobile contact points. Separate and complete units, they can be moved along a track to the desired dimension and set by means of a locknut to provide effective and excellent electrical contact.

Great savings have been realized in money, time, materials and storage space by the use of three 6½ inch x 25 inch racks at the Laboratories. The three facilitated anodizing jobs which would have ordinarily required as many as 60 racks of different dimensions.

Levine and Esseff have applied for a patent on thier unique rack.

TANK HEATING PROBLEMS ELIMINATED!

CLEPCO FUSED QUARTZ IMMERSION HEATERS

Heating your acid tanks with Clepco Electric Immersion Heaters is the most modern and now the most proven of all methods known today.

ASK YOUR LEADING PLATING SUPPLIERS

OVER 100,000 INSTALLATIONS PROVE *CLEPCO* FUSED QUARTZ IMMERSION HEATERS ARE BEST

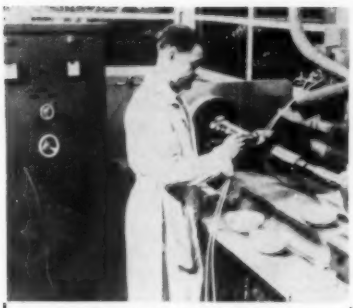
Clepco Steel and Stainless Immersion Heaters are designed to meet the specific demands of the Alkaline Bath heating problems of the Industry.

WHEN A BETTER HEATER IS MADE, CLEPCO WILL MAKE IT.

clepco FUSED QUARTZ IMMERSION HEATERS

SEE YOUR PLATING SUPPLY HOUSE
WRITE US FOR LITERATURE

THE CLEVELAND PROCESS COMPANY
1965 EAST 57TH STREET • CLEVELAND 3, OHIO



Building Up by Electroplating

E—336. Localized Plating—A new and highly advanced method for localized and selective electroplating is now available in the United States and Canada. It is sold under the trade name of "The Dalic Process."

The Dalic Process has been extensively used for a number of years by many of the major industries in England and on the European Continent. Applications include build-up and repair of worn components; electroplating of selected areas of electrical contacts and electronic parts; plating of plastic-metal combinations; soldering and selective carburizing; automatic strip and wire plating; plating aircraft components; and for numerous other applications where high-speed deposition is required on small areas without stopping-off or dismantling.

Dalic plating utilizes a newly designed group of air and water-cooled styluses and a complete range of special non-toxic, non-fuming metallo-organic solutions. These solutions are capable of plating small areas of amazingly high current densities—in some cases as high as 6000 amperes per square foot, as shown. Among the metals which can be plated are the following:

	Maximum Current Density Amperes square foot	Time in Seconds to Deposit 0.0001"*
Cadmium	6000	2.5
Chromium	4000	63.0
Copper	6000	2.5
Gold	2000	6.2
Indium	4000	2.5
Iron	3000	10.2
Lead	5000	3.8
Nickel	5000	5.1
Platinum	3000	17.5
Rhodium	3000	70.0
Silver	1250	5.1
Tin	5000	2.5
Zinc	3000	3.8

The Process has the additional advantage of being completely portable, and occupying very little space. It is, in fact, a plating shop on a table.

E—337. Fast, Fine Screener—A new high-speed vibrating screen 30 to 80 per cent faster than previous mechanical screens has been developed by Hewitt-Robins, Inc., for the fine screening of such materials as sand, clay, fertilizers, chemicals, coke, coal, asbestos, detergents and instant coffee.

The new screen has a speed of 3300 rpm when set for a $\frac{1}{2}$ in stroke and 2400 rpm when operating on a $\frac{1}{4}$ in stroke. The maximum speed in the past has been 1800 rpm. The new screen represents a completely new design featuring several important engineering advances, including a new lubricating technique in which atomized oil is injected under pressure into bearings in the form of a fine airborne mist. This oil mist system prevents the overheating of bearings formerly encountered at high speeds when conventional grease and lubricating oils were used.

The new screen, to be called the "HS Vibrex," is especially designed for use with screen cloth of 10 to 80 openings per lineal inch. Under certain conditions it will be suitable for separations as high as 100 mesh. Wet or dry materials can be screened, and the unit is designed for applications requiring electrically heated screen cloth to prevent blinding of cloth openings by damp materials.

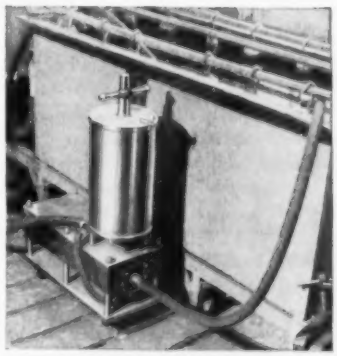
E—338. Strapping Tape Cutter—An adjustable cutter for use with heavy duty strapping tapes is now available from the Permacel Tape Corporation of New Brunswick, N. J.

The cutter, made of heavy molded plastic with a steel cutting edge, is designed for use with either $\frac{1}{2}$ inch or $\frac{3}{4}$ inch tapes and can be adapted quickly for either size. The fine-honed edge is suited for cutting the heaviest strapping tapes in common use.

LOOK

No Rejects

NO pitting, spotting, or reworking . . . . . .



"Sealed-Disc" Filters remove more impurities with less effort and in less time. Use it on your acid dips, electro cleaners, and solvents too.

Impurities—primary cause of pitting, spotting, rejected finished work—are positively eliminated by the Alsop "Sealed-Disc" Filter. That's because they're designed for Platers—to meet plating room requirements. That's why they're compact, portable—smaller than conventional filters—save valuable space—yet capable of handling equal volumes of solutions.

Simplicity of design cuts operating time and labor—means savings for you. Check its many additional proved performance features and know why more platers depend on "Sealed-Disc" Filters. Ask your regular plating supplier—or write for details.

ALSOP Positive Filtration

ENGINEERING CORPORATION FIRST STEP IN CUTTING COSTS

1103 FINE STREET • MILLDALE, CONNECTICUT

EQUIPMENT & SUPPLIES

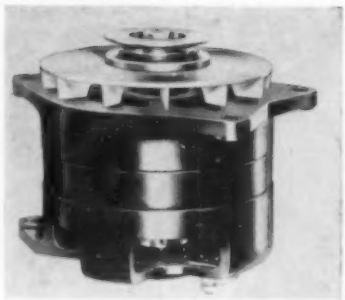
E—339. Eye Protection—Pulmosan, long a leader in protective eye equipment, now offers two new series of safety goggles that are designed for maximum eye protection, maximum user comfort and new, never before achieved eye appeal. Descriptive circular and price data available upon request.

E—340. In Oakite's ASTE Exhibit—Oakite Rustripper, the alkaline compound that removes rust, oxide scale, paint and shop soils without changing dimensions of precision parts or causing hydrogen embrittlement, will be the Blue Ribbon product at Booth 1325 at the American Society of Tool Engineers Industrial Exposition in Chicago's International Amphitheatre, March 19 to 23. It will be displayed by Oakite Products, Inc., manufacturers of industrial cleaning and metal working compounds.

Oakite will also feature Oakite Soluble Oil for machining, grinding, and cutting; Special Drawing Compound and Oakite Composition No. 12 for drawing and forming; and alkaline, solvent, and acidic detergents for production and maintenance cleaning.

F. J. McNally, manager of Oakite's Chicago division, will be in charge of the booth. He will be assisted by technical service representatives A. A. Becker, Jack Becker, K. J. Birdwell, E. H. Olson, and T. A. Sailor.

E—341. Alternators—Two new models of its line of heavy duty alternators designed to replace standard dc generators



In Place of Generator

on passenger cars, light and medium trucks, school buses, or other equipment which is driven regularly at slow speeds with frequent stopping and starting, or which have heavy electrical loads, have been introduced by the Leece-Neville Company, Cleveland.

Model No. 5410-G3 is designed for rolling equipment with six-volt electrical systems. It has a 95-ampere capacity. It is particularly suited for such specific types of vehicles with two-way radio or telephone as police cars, highway patrol, taxicabs and utility trucks.

Model No. 5412-G6 offers the same applications except that it is used on vehicles having 12-volt systems. It has a 50-ampere capacity (equal to 100 amperes at six volts), and can be modified to give up to 125 amperes.

E—342. Work Gloves Resist Solvents—While coated fabric work gloves offer decided advantages over the uncoated type as regards both wearing qualities and hand protection in many applications, most coatings have failed rapidly when subjected to high power solvents of the nature of ketones, acetones and petroleum base degreasing solvents such as Varsol and Mid-Solv.

Curved Fingers and Wing Thumb

To meet this situation, Surety Rubber Company, Carrollton, Ohio, has developed a new coating compound which is practically indestructible in the presence of such chemicals. It has been trade-named Solvaseal and is now being applied to fabric work gloves which are sold under that name.

SEE FOR YOURSELF

The American Brass Company, Waterbury 20, Conn. *In Canada:* Anaconda American Brass Ltd., New Toronto, Ont.

Please give me details on how I can get a test supply of "Plus-4" anodes sufficient to fill one tank.

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How you can cut copper costs with

"PLUS-4" ANODES

(Phosphorized Copper)

You can stop throwing copper away in acid solution dumped to correct solution concentration. You can also reduce acid you have to add—another cost saving. And there's no copper wasted as sludge at the bottom of the tank.

Because anodes corrode uniformly, you can get more cathode deposit per anode. Smaller "fish" mean lower scrap loss.

Smooth, heavy cathode deposits—without diaphragms or "bagging"—mean better work.

Find out for yourself—as other electrotypers have—how easy it is to cut your acid plating costs with "Plus-4" Anodes. 56137

WHY PLATING WITH "PLUS-4" ANODES COSTS LESS

+1 no anode sludge (no "bagging" or diaphragms required)

+2 no copper "build-up" in solution

+3 smooth, heavy cathode deposits

+4 up to 15% more cathode deposit

"PLUS-4" ANODES

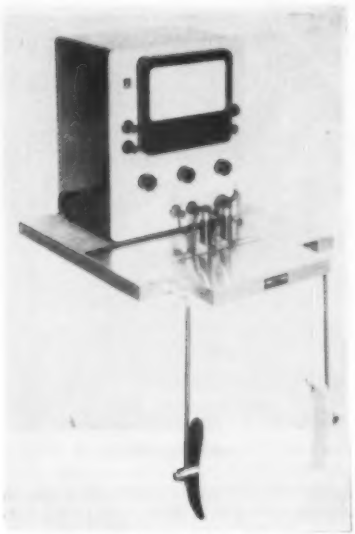
a product of

ANACONDA®

made by

THE AMERICAN BRASS COMPANY

For use under U. S. Patent No. 2,689,216



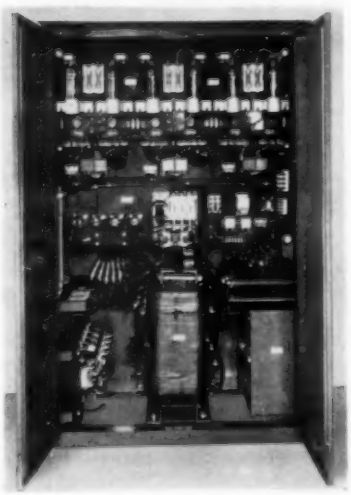
Against a Standard Impedance

E—343. Deviation Test Bridge—A new addition to the line of Deviation Test Bridges, extremely fast direct-reading impedance comparison instruments, has been introduced by the Brush Electronics Company, Cleveland, Ohio.

The instruments are used primarily for production inspection, inspection of resistance, capacitance and inductance. They are designed to accurately and quickly present a comparison against a standard impedance indicating both percentage impedance deviation and phase angle deviation in radians on a 6-inch illuminated scale.

E—344. 10 to 1 Ratio Control—Now available is a new variable speed motor drive consisting of a dc motor with an electronic rectifier power supply. This thyratron control permits constant full load torque at all speeds from minimum to maximum and has a speed range of 10 to 1.

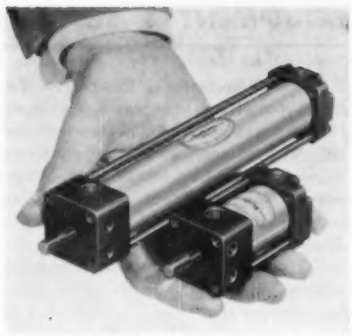
Thyratron Speed Control



This new unit, called the Theratrol, was recently announced by Ther Electric Works of Chicago, Ill.

The electronic rectifier power supply is a grid controlled regulated variable armature supply and a fixed field supply. Six Xenon-filled thyratron tubes accomplish the armature rectification and no other tubes or thermionic devices are used. The maximum armature current is limited by a control circuit which can be adjusted from 100 to 200 per cent of full load. And the current cannot exceed this pre-set value even though the motor is stalled with the speed control in the maximum speed position. The pulse firing of the thyratron tubes eliminates electrical interference and assures stable control settings.

E—345. Cylinder Line—Additions to The Bellows Han-d-Air line of small air cylinders have been announced by the company. A double-acting model (air-powered advance stroke, air-powered retract stroke) is now available as well as single acting air-powered advance, spring return units. Previously available in 1 inch stroke only, both types are now offered in 1 inch, 2 inch, 3 inch, and 4 inch strokes.



Air Powered Strokers

How to IMPROVE YOUR PLATING OPERATIONS with SEYMOUR BRIGHT NICKEL

TO OBTAIN THIS DEPOSIT USE THIS SEYMOUR BRIGHT NICKEL PROCESS

	*Type	Solution	Active	Method	Deposit
BRIGHT	C	Warm	Yes	Still	Decorative
BRILLIANT	NC	Warm	Yes	Still Barrel	Decorative Specification
ULTRA BRILLIANT	CK	Warm	No	Still Barrel	Decorative Specification
NORMAL NICKEL	R	Cold	—	Barrel	Decorative
BLUISH TINT	NR	Cold	—	Barrel	Decorative
DEEPER BLUE	RS	Cold	—	Barrel	Decorative

(*) For best results use these solutions with SEYCAST 99% cast anodes. Write for SEYMOUR bulletins giving complete details.

SEYMOUR BRIGHT NICKEL PROCESSES efficiently deposit on steel and ferrous alloys, on brass and nonferrous alloys and on zinc-base alloys which have been previously copper-plated.

They give you these important features: —

- GREATER THROWING POWER to successfully plate deeply recessed articles.
- HIGH DUCTILITY (in all but the "CK" process) which permits further fabrication after plating.
- MINIMUM OF CONTROL with easy operation and freedom from hydrogen pitting.
- SAVINGS in time and money because active surfaces require no reactivation, cleaning or wiping before chrome plating.

THE SEYMOUR MANUFACTURING CO.
5 FRANKLIN STREET, SEYMOUR, CONNECTICUT

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 400.

EQUIPMENT & SUPPLIES

E—346. Non-Sagging Plastisols—Two new types of spraying plastisols that can be sprayed on cold metal in a vertical position without sagging when applied over Stanley Plastisol Primer No. 40X-415 are announced by The Stanley Chemical Company, East Berlin, Conn., a subsidiary of The Stanley Works.

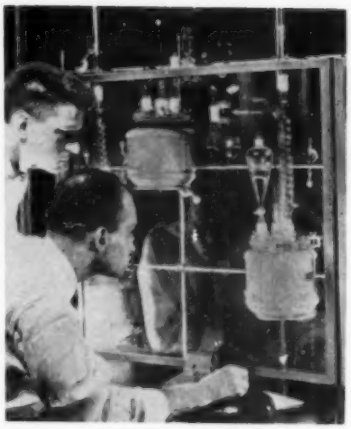
Both types are true plastisols and contain no volatile ingredients. The manufacturers say that these plastisols have extremely high gloss when applied according to their directions and can be sprayed at 100 per cent solids.

Type 1 is recommended for film thicknesses of from 10 to 15 mils, and is available in a range of colors for decorative finishes for use on automatic washing machines, dishwashers and similar products.

Type 2 is available in black and is recommended for film thicknesses of from 50 to 60 mils without heating between coats. This type is designed for lining chemical storage tanks, tank cars and comparable equipment.

E—347. Firm Footing—Strangely enough, laboratories are among the safest places in which to work, despite the possibility of explosion due to pressure, chemical reaction or the collapse of vacuum apparatus. One reason: the widespread use of safety shields, whose shatterproof glass guards today's workers from flying particles and liquids.

Now, from the safety project engineers of the Fisher Development Laboratories come three new shields that quite literally put safety on a more secure basis than ever before.



Safer Safety Shield

Instead of wing screws for clamping the shields to their feet, giving only **point** contact with the shield frame, the new design uses broad vise-like jaws (closed by lever action) that grip the frame over an area of 8 square inches.

E—348. Blast Cleaning Abrasive—A new steel grit blast cleaning abrasive, for producing etched finishes, is announced by Wheelabrator Corporation, Mishawaka, Ind.

Gritty (×5)

Known as Steeletts, this grit is of high-carbon electric arc furnace steel, specially heat treated to provide the toughness required for blast cleaning operations. It is in the same hardness range as chilled iron abrasives. Steeletts, however, are free from the brittle carbides which cause rapid breakdown of chilled iron. Steeletts particles do not chip away upon impact. The grit shape endures for hundreds of cycles without the sharp edges that are caused by fracturing. Lack of these cutting edges reduces blast cleaning machine wear and maintenance. Abrasive embedment in the work is reduced.

For Electroless Ni

E—349. Electroless Tanks—Metal Processing Co., Cedar Grove, N. J., is introducing a new line of Electroless Nickel Plating Tanks. The equipment configuration was designed as the most practical and economical after a year of intensive research and test. The unit features a hot water heating jacket surrounding a liner coated with a trifluorochloroethylene type plastic, continuous filtration and gravity feed of chemicals for continuous operation. The 50 gallon unit pictured is ideally suited for basket or barrel operations when extremely thin plated coatings are required. The standard line also includes 100 and 250 gallon sizes. Other sizes can be designed and manufactured on order.

E—350. Regulated Rectifiers—A regulated, 14/28 volt, 200/100 amps dc power rectifier, designed to meet Air Force specifications MIL-P-8194 and MIL-P-6457A, is available for commercial application by the Rapid Electric Company, Bronx, N. Y.

Operating on 220/440 volts, 30, 50-60 cycles, the output voltage regulation from no load to full load is held within 0.5 volts, including a variation of ± 10 per cent of the rated input voltage.

Automatic controls include such safety features as air flow switches to guard against possible fan-motor ventilation failure, and thermal relay protection against prolonged current overload. Failure of any phase of input will shut power supply off instantaneously. Technical details in Booklet H-1 are available.

E—351. Bright Cd Plating Process—A new Cadalume Process for Bright Cadmium Plating in still tanks has been announced by Hanson-Van Winkle-Munning Co. It introduces a simple to operate, low-cost bath for producing bright, uniform, eye-appealing cadmium deposits.

Cadalume makes bright dips unnecessary, although it will take conversion coatings. The Cadalume brightener may be added directly to the bath. No break-in period is needed; the desired deposit brightness appears immediately in a balanced bath.

Although the Cadalume deposit has exceptional brightness as deposited, on deeply recessed work, a 1 per cent nitric acid bright dip may be used to brighten low current density areas.

This new process increases plating speeds, improves deposit distribution and throwing power, and produces heavy deposits, where required, without loss of brilliance or formation of surface defects.

The Cadalume bath is a clear solution, which assists in arranging work in the tank. Unlined steel tanks have proved satisfactory for cadmium solutions. Rubber lined steel tanks can also be used, as current can be directed to the work with greater certainty of even metal distribution.

Steel or copper racks may be used, provided they are insulated to conserve metal and current, and to prevent contamination of the solution.

E—352. To Substitute Al for Cu—The chrome sealer, Kenvert 40 has finally overcome the problem of aluminum oxidation thus making it possible to substitute aluminum for copper in electrical work in protected areas. According to the manufacturer, Conversion Chemical Corporation, who recently placed the sealer on the market, Kenvert 40 is especially designed to prevent the oxidation of aluminum when that metal is used in place of copper for electrical purposes in sheltered areas. In the past, many attempts have been made to substitute aluminum for electrical conductivity—but with little or no success. The aluminum simply oxidized, causing poor contacts and the subsequent failure of the mechanisms involved. Kenvert 40 solves this problem of aluminum oxidation by sealing the aluminum with a film having a very low microhm resistance.

ATLANTIC GREASELESS COMPOUNDS *are unexcelled*

for fast, clean-working

POLISHING & BUFFING OPERATIONS

in the finishing of

METALS, PLASTICS, & WOOD.

Economy-pak foil lined, fibreboard container

ATLANTIC GREASELESS COMPOUNDS are produced by specialists with a background of long experience in the compounding and application of greaseless finishing materials.

The rigidly controlled uniformity of ATLANTIC COMPOUNDS helps you maintain your high finishing standards. This dependable uniformity is assured by the highest grade ingredients and by extremely close quality control in manufacturing.

Devoted exclusively to producing unexcelled greaseless compounds, Atlantic maintains constant research striving for continually improved products. Technical assistance and data available upon request.

Aluminum Tube

THE ATLANTIC COMPOUND CO.

1860 BALDWIN STREET WATERBURY, CONNECTICUT

EQUIPMENT & SUPPLIES

E—353. Sprayable Plastisol—Michigan Chrome and Chemical Company, Detroit, Mich., announces **Miccrosol Spray S-2003,** a plastisol which can be applied by spraying for industrial coatings.

Miccrosol Spray S-2003 is a true 100 per cent sprayable plastisol. It is sprayed as received with conventional spray equipment—no thinners or solvents are required. This means that industrial applicators, specializing in linings and coatings of items as large as tank cars, are able to utilize the superior corrosion-resistant properties of a plastisol in a practical, efficient manner.

Miccrosol Spray S-2003 has the same toughness—chemical, corrosion, and abrasion resistance as Miccrosol E-1003. It can be used as a coating for all plating baths and Miccro adhesive systems provide outstanding adhesion to metal surfaces. When properly applied and cured, S-2003 is equivalent on a per mil basis to E-1003, properly applied and cured. Coaters, needing assurance of quality and anticipated life, find this background most comforting.

E—354. Gold Plater—A complete self-contained unit including dc power supply and double wall stainless steel tank. The power supply has stepless voltage control, large meters and timer to insure accurate plating.

The double wall tank unit is heated with sealed contact heaters that are thermostatically controlled.

Au Plater

A cathode rod agitator is incorporated for uniform heavy deposits on industrial parts.

This unit was designed to meet the increasing demand for gold plating of printed circuits and other industrial components. It is manufactured by Ramyr Manufacturing Co., Los Angeles, Cal.

E—355. Name Change—Enthone, Inc., New Haven, Conn., announces a change in name only of their acid activating compound "Actane" (trademark registered). In view of their addition to this line of acid activators for various uses, namely, Actane 70, it has been decided that the use of a suffix number to designate the original product will eliminate confusion for those customers who might be using both products. There has been no change in the formulation or manufacture of Actane 22 (formerly called Actane).

Actane 22 is a neutral activating compound for addition to hydrochloric or sulfuric acid pickles to remove colloidal films from metal surfaces. It is particularly useful prior to bright plating operations.

Actane 70 is an acidic fluoride-containing compound used as a replacement for liquid hydrofluoric acid. It is much less hazardous to handle being a crystalline solid. Literature is available upon request.

E—356. Corrosion-Proof Coating—Rubba, Inc., announces the development of Rubbakote, a liquid rubber coating which prevents corrosion in electro-plating tanks.

Rubbakote is self-vulcanizing, requires no mixing, and adheres tenaciously to all types of metal. Rubbakote dries within 30 minutes after application. It is not affected by acid or alkali, and can easily be applied by brush or spray, the manufacturer claims.

the KLEM representative

—he's in your area to help you

The next time the KLEM man calls at your plant take advantage of his specialized experience and training in metal surface cleaning and preparation. If you have a problem he may be of help to you on the spot, if not he'll use the KLEM-PLAN to present the facts to our lab technicians who will find a quick answer for you.

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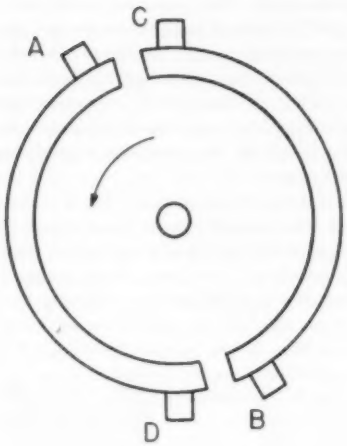


Commutator for periodically changing the direction and magnitude of direct currents

F. Ogburn† and H. Salmon†

A commutator designed to deliver a periodically reversed current having different potentials and currents for the anodic and cathodic phases has proved to be useful in certain electrodeposition researches. The cycle time is adjustable, as is the fraction of the cycle for each phase, and currents up to 10 amps have been used with frequencies up to 150 cycles per second. The commutator can also be used for obtaining intermittent direct current or for periodically changing the magnitude of the current without changing its direction.

While the design or principle may have been used by others, it does not appear to be readily available in the literature of the electrodeposition field. Details of construction are not given here, as a number of ways of constructing the commutator will be evident to a good mechanic.

A diagram of a simple commutator for periodically reversing the current is shown in Fig. 1. This type of commutator is of interest in itself and is also discussed here to facilitate the description of the more versatile commutator shown in Figs. 2 and 3.

The commutator shown in Fig. 1 is made of two brass circular ring segments mounted on an insultating Bakelite disc or rotor. The pair of commutator brushes C and D are mounted in fixed positions on opposite sides (180° apart) of the commutator shaft. The pair of commutator brushes A and B, also mounted 180° apart, may be adjusted in angular position relative to the pair C and D. Brushes A and B are connected to the electrodeposition bath and C and D to the source of direct current.

With the rotor in the position shown in Fig. 1a, the current passes from the current source through brush C to brush B, through the bath to brush A, and back to the cur-

† National Bureau of Standards

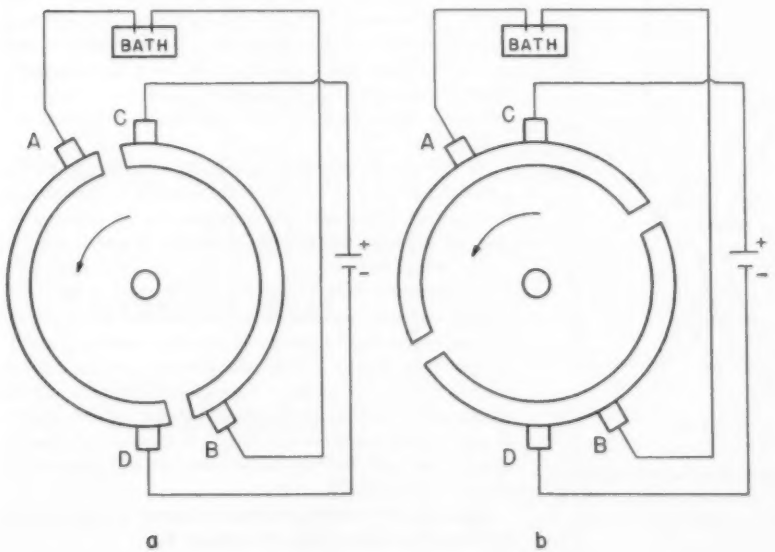


Fig. 1. Two-segment commutator and circuit for periodically reversing current

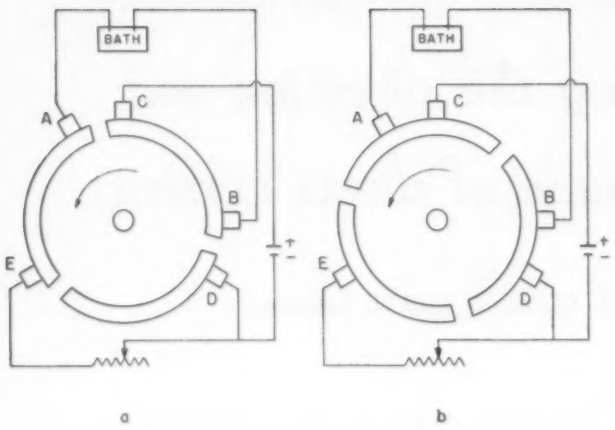


Fig. 2. Three-segment commutator and circuit for periodically reversing current. Magnitude of current is independently adjustable for anodic and cathodic currents, (single current source)

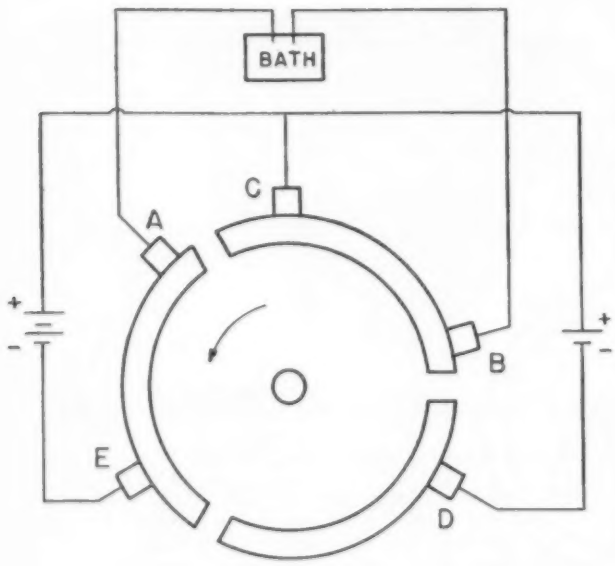


Fig. 3. Three-segment commutator and circuit for periodically reversing current. Magnitude of current is independently adjustable for anodic and cathodic currents (two current sources)

rent source through brush D. With the rotor in the position shown in Fig. 1b, the current passes from brush C to brush A, through the bath to brush B and then to brush D. The direction of the current passing through the bath has been reversed. In this manner the current is reversed four times as the rotor makes one complete revolution. In other words, one revolution of the commutator produces two complete current cycles.

With the brushes in the positions shown in Fig. 1 the interval during which the current passes from brush C through the rotor segment to brush B is much shorter than the interval during which current passes from brush C through the rotor segment to brush A. Consequently, the current passes through the bath in one direction for a longer period of time than in the reverse direction. By shifting brushes A and B with respect to brushes C and D, the interval during which the current passes in a given direction can be adjusted to any value from 0 to almost 100 per cent. By regulating the speed of the rotor the cycle time or frequency can be adjusted.

The commutator just described does not permit one to regulate the current magnitude or direction independently of the current in the opposite direction. A three segment commutator with five brushes was designed as follows for this purpose.

Fig. 2 is a diagram of such a commutator. Three equal ring segments are used. The brushes of the set C, D, and E are in fixed positions 120° apart. Brushes A and B are 120° apart and can be shifted with respect to the fixed brushes C, D, and E. The electrodes of the bath are connected to brushes A and B. One pole of the current source is connected to brush C. The other pole is connected to brush D directly and to brush E through a variable resistor.

With the rotor in the position shown in Fig. 2a, the current will pass from the current source to brush C through brush B, the bath, brush A, brush E, and the variable resistance, in that order, and back to the current source. In the position shown in Fig. 2b, the current passes through brush C, brush A, the bath, brush B, and brush D, in that order. The current through the bath has been reversed; and, since the resistor has been bypassed, the potential across the bath and current are different in magnitude. During one revolution of the rotor, the current is reversed six times. This results in three complete and identical current cycles.

As with the simpler commutator shown in Fig. 1, the interval for current in one direction relative to the interval for current in the opposite direction can be changed by shifting the angle of the pair of brushes A and B relative to the set of fixed brushes C, D, and E. The period for one complete cycle is determined by the speed of the rotor.

The variable resistance can be removed and a second current source can be connected between brushes C and E as shown in Fig. 3. With the polarity of the current sources as shown, the same type of current cycle will be obtained as with the circuit shown in Fig. 2. If the polarity of one current source is reversed, then the current passing through the bath will not be reversed but will periodically change in magnitude.

A periodically interrupted direct current is obtained by disconnecting either brush D or brush E.

The authors offer two suggestions based on their experience with trial commutators: First, it may be desirable to avoid the limitation that arises from interference of the brushholders in the mechanical adjustment for fixing the intervals of the two parts of the timing cycle if the movable pair of brushholders is mounted in the same plane as the fixed set of brushes. If the five brushes are in the same plane, then the adjustment of the time cycle is limited by how close brushes A and B can be brought to the other brushes without shorting through the brushholders. This difficulty can be eliminated by using ring segments wide enough that the fixed set of brushes C, D, and E can be located in one plane and the adjustable pair A and B can be located along side in an adjacent plane separated with sufficient side clearance to permit moving them in their circle past the fixed set. Second, the spaces between the rotor segments should be as nearly equal to the width of the brushes as possible. If the width of the spaces is more than the width of the brushes, the circuit will be broken momentarily when a brush is midway between segments. If the width of the spaces is less than the width of the brushes, a momentary short circuit will occur while a brush is in contact with two segments.

Acknowledgement

The commutator described was designed and constructed as part of a project supported by Frankford Arsenal.

Fielding Ogburn is Assistant Chief of the Electrodeposition Section of the National Bureau of Standards. B.S. in Chemistry in 1941 from the University of Chicago. Served in the Army in Italy in World War II. Joined Dr. Blum's group at NBS in 1946. Delegate and Past President of Baltimore-Washington Branch, AES. Director, AES Project 13, Chairman Washington-Baltimore Section of the Electrochemical Society. Chairman Subcommittee I of ASTM Committee B-8.

Harry I. Salmon, a native of Lock Haven, Pennsylvania, is a chemist in the Electrodeposition Section, Chemistry Division, National Bureau of Standards, Washington, D. C. After several years' experience in industrial laboratories in Pennsylvania, joined the staff of NBS in 1936, and since that time has been a member of the Organic Coatings and Electrodeposition Sections.

Determination of Copper in Copper Plating Solutions Using Ethylene Diamine Tetracetic Acid

F. W. Gutman†

†Plating Chemist, 2129 N. 52nd St., Milwaukee, Wis.

Using the publications of Leftin[1], Rohco[2] and Langford[3], in which the versatility of EDTA was shown, as a basis, the possibility of using EDTA for the analysis of copper-plating solutions was investigated.

EXPERIMENTAL

Several samples of pure copper wire, each weighing about 100 mg were prepared. Each sample was dissolved in 5 ml concentrated nitric acid, 5 ml distilled water and 5 ml concentrated sulfuric acid. The solution was heated until the white fumes of sulfur trioxide appeared. After cooling, 100 ml water and 30 ml concentrated ammonium hydroxide were added to bring the *p*H of the solution to approximately 6.0. Since the standard Eriochrome Black T indicator solution gave no distinct color change, ½ g Murexide indicator (ammonium purpurate) was used which colored the copper solution light brown.

This solution was titrated with 0.05 MEDTA (18.6 g EDTA made up to a liter with distilled water.)

During the titration, the brown color changed to green and finally, at the endpoint, to a reddish purple.

Several subsequent titrations gave nearly identical results:

1 ml = 0.0033489 g Cu (1)
= 0.0033487 g Cu (2)
= 0.0033484 g Cu (3)
= 0.0033487 g Cu (4)

which furnished proof for the validity of the procedure for pure copper.

CYANIDE COPPER

A sample of cyanide copper plating solution was then analyzed to investigate the practicability of the method for this type of copper plating solutions. A 2 ml sample was treated in the conventional method for cadmium and zinc cyanide solutions, i.e., acidified with 1N sulfuric acid and then 10 ml concentrated ammonium hydroxide added. The addition of Murexide did not show the expected reddish brown, but a light purple and the titration showed no endpoint.

Another 2 ml sample was acidified (under hood) with 10 ml concentrated sulfuric acid and oxidized with 10 ml hydrogen peroxide (30 per cent) and boiled until the white fumes of sulfur trioxide appeared. After cooling, 100 ml distilled water and 30 ml concentrated ammonium hydroxide were added and again cooled to room temperature.

Using ½ g Murexide, the titration with EDTA, gave a similar color change and endpoint as the pure copper standard solution.

ACID COPPER

To a 2 ml sample 100 ml distilled water and 30 ml ammonium hydroxide were added. Using ½ g Murexide indicator, the solution underwent the expected color change during the titration, to the purple endpoint. No difficulty was experienced in determining the endpoint.

METALLIC IMPURITIES

Addition of varying amounts of silver, zinc, cadmium and iron up to 10 per cent of the weight of contained copper separately and also a mixture of these metals up to 10 per cent did not interfere with the titration, i.e., the endpoint appeared after the same number of ml EDTA was added as with the pure standard solution. Each new EDTA solution should be standardized against 0.1 g of pure copper wire or against a copper standard solution containing 50 g/l of copper.

The EDTA method for the determination of copper is simpler and faster than the conventional analysis using sodium thiosulfate, and more accurate, being less subject to errors. The color change in the thiosulfate method is not abrupt but recurs several times before the cream color becomes permanent.

Results with EDTA were slightly higher than with thiosulfate, as shown by the following comparison:

EDTA Method	Thiosulfate Method
5.26 oz/gal	5.23 oz/gal
5.03 oz/gal	5.02 oz/gal
3.16 oz/gal	3.15 oz/gal

Method for Copper Cyanide Solutions:

1. Pipette a 2 ml sample into a 250 ml Erlenmeyer flask.
2. Add 10 ml concentrated sulfuric acid (under hood) and heat to boiling.
3. Add slowly 10 ml 30 per cent hydrogen peroxide and let boil until white fumes of sulfur trioxide are evolved.
4. Cool and dilute with 100 ml distilled water.
5. Add 30 ml concentrated ammonia.
6. Cool to room temperature and add ½ g Murexide.
7. Titrate with EDTA solution until the color changes to purple.

Calculation: F × ml used for titration = oz/gal Cu

Method for Copper Sulfate Solutions:

Same as above, except omit steps 2 and 3.

Calculation: F × 3.93 × ml used for titration = oz/gal $CuSO_4 5H_2O$

REAGENTS

Murexide Indicator: Weigh out 0.2 g of Murexide compound (ammonium purpurate) and grind together with 100 g sodium chloride CP until they are intimately mixed—store in brown bottle away from light.

0.05M EDTA Solution: Dissolve 18.6 g of the disodium dihydrate salt of ethylene diamine tetraacetic acid in 1 liter distilled water.

Standardize as follows:

1. Dissolve 0.1 g pure copper wire in 5 ml concentrated nitric acid, 5 ml distilled water and 5 ml concentrated sulfuric acid.
2. Heat until white fumes of sulfur trioxide appear.
3. Cool, add 100 ml distilled water and 30 ml concentrated ammonium hydroxide.
4. Add ½ g Murexide indicator and titrate with EDTA solution to the purple endpoint.

$$\text{Calculation: } \frac{\text{g Cu} \times 500 \times 1.34}{\text{ml EDTA} \times 1000} = \text{F}$$

References

[1]Leftin, Determination of Zinc and Cadmium in Plating solutions. (Metal Finishing, April 1954).

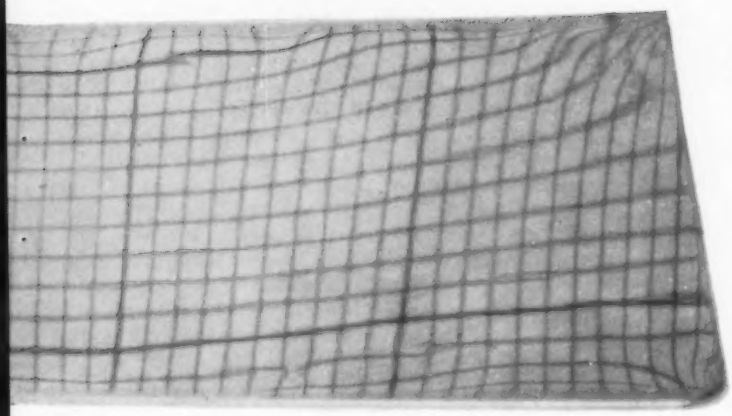
[2]R. O. Hull & Co. Bulletin on the analysis of Zinc and Cadmium using EDTA (Feb. 1955).

[3]K. E. Langford, The Determination of Nickel in Nickel Plating Solutions. (Metal Finishing, Sept. 1954).

Frank W. Gutman was born in Vienna in 1900 and attended primary and secondary school there which enabled him to study at any medical, technical or law school. After studying law for four years, he joined his father's business firm as representative for British textile companies for Europe. These activities he carried on successfully until Austria was annexed by Nazi-Germany in 1938.

He came to Milwaukee in the same year and worked for four years in various capacities for a knitting company there, then for two years as time study engineer for a metal fabricating concern.

In 1944 he became plating chemist at a well known electrical manufacturer there, which position he still occupies. He was among the first men to adapt "electroless nickel" for production and has done some work in analysis, thickness testing and plating of precious metals, tungsten, cobalt, et cetera.



FURTHER STUDIES IN *Heavy Rhodium Plating*

by H. J. Wiesner† and H. A. Meers†

In a previous paper[1] a report was made of the effects of a number of variables on the efficiencies of relatively concentrated rhodium plating baths. These studies were made in order to establish the optimum operating conditions for producing heavy rhodium deposits (0.0001-0.0004 inches) on a jet pump component. The effects of certain inorganic and organic impurities were also observed in a qualitative manner.

As a continuation of this work, a quality control program was instituted in order to minimize the rejects due to plating. This factor was particularly important since the rhodium could not be stripped from the expensive parts being plated. Salvage of the parts required boring out seven bores, sleeving and replating.

INTRODUCTION

QUALITY CONTROL

As a part of this program, testing of each lot of rhodium sulfate concentrate received was started.

It was hoped that on a long range basis that spectrographic analyses of each lot along with certain plating and physical tests would serve to establish:

(a) A normal level of trace impurities that might be expected.
(b) A relationship of the levels of certain impurities to the appearance of the deposits as well as their physical properties.
(c) A correlation between the properties of the solution and deposits made from a new bath and one which was giving trouble.
(d) A means of isolating the plating difficulties.
(e) A basis for studying the effects of addition agents.

Accordingly, the following tests were run on each batch (300–800 g) of rhodium concentrate received:

1. Spectrographic analysis.
2. Plating efficiency test.
3. Five-minute Hull Cell panel.
4. Stress measurement of deposit 0.0002–0.0003 inches thick.
5. Bend test on 0.0002–0.0004 inches thick deposit plated on an aluminum bronze (AMS 4640) sleeve.

In addition to checking in-coming lots, periodic tests of the same type were made on production baths which had been in operation for some time.

The most common troubles encountered with rhodium plating by the production plating department were (a) flaking of the deposits and (b) roughness of the deposit. The obvious causes for flaking are:

(a) Improper preparation of the base metal prior to plating.
(b) Breaking of the current at any stage of plating.
(c) High stresses in the rhodium deposit.
(d) A combination of (a) and (c).

It was anticipated that a measurement of the stresses in the deposit from a bath giving trouble would serve to isolate the source of the trouble providing measurements had been made on the new solution.

The bend test outlined under (5) above was used for judging the appearance of a heavier deposit. It was also employed as a qualitative correlation between stress measurements and tendency to crack in the "as plated" condition or upon bending.

Fig. 1 shows the pump rotor to be plated with the anode assembly in place.

Fig. 2 is a general view of the production plating set-up, showing Plexiglas plating cells, water baths, ampere hour meters, and gages used for checking the parts after plating.

† Bendix Products Div. of Bendix Aviation Corp., South Bend, Ind.

Fig. 1. Pump Rotor to Be Plated With Anode Assembly in Place

SPECTROGRAPHIC ANALYSIS OF RHODIUM SULFATE CONCENTRATES

The supplier of the rhodium concentrate was requested to submit a complete spectrographic analysis of each lot shipped. Records of these analyses were kept and notes made as to plating characteristics of the various lots. Typical ranges of the impurities and notes pertaining to the plating results are shown in Table I.

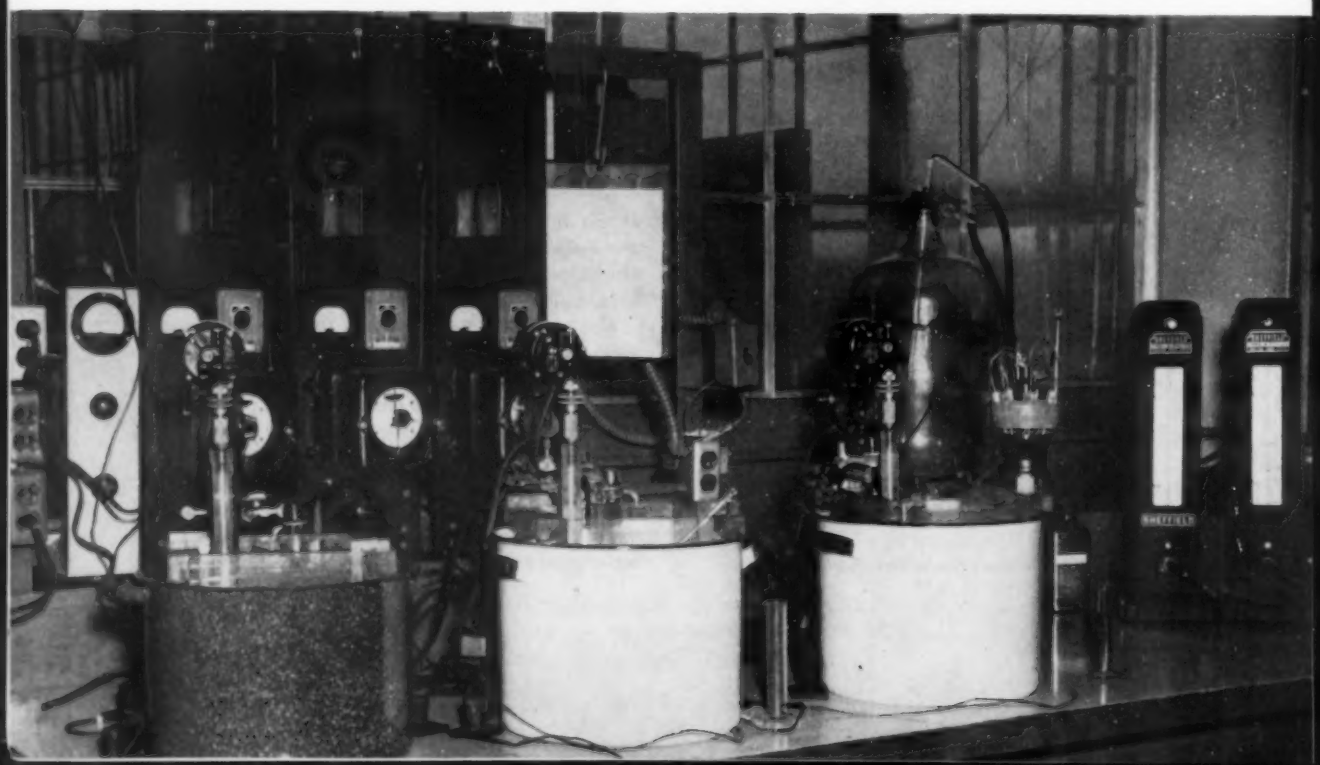
It will be noted that impurities (except sodium) were present in very low percentages. Because of the low concentrations, specific values were not assigned to the percentages, but they were reported as an X with the proper number of zeros in front of it. X represents a number between 1 and 9. Thus, a value of 0.00X means that the impurity was present in the range of 0.001–0.009 per cent. If the density of the spectrographic line, indicated the impurity was present on the low side of the range, it was designated as XL. Conversely, if the density indicated the impurity was on the high side, it was designated by XH.

A careful study of these data and a correlation with plating tests and production plating results actually gave little information as to what impurities might be beneficial and which detrimental. There were indications, for example, that lots having very low copper were poorer than the ones having higher concentrations. This led to the thought that copper added in the proper amount, might act as a brightener. Some experiments were carried out to check this point and these results are reported later in the paper.

There were also indications from Table I that lead was detrimental. Actually lead has been reported[2] to act as a brightener in rhodium baths. This point was checked and is also covered later.

It is recognized by the authors that metallic ions as im-

Fig. 2. General View of Production Rhodium Plating Setup



purities may have counteracting effects, and this probably accounts for some of the inconsistencies encountered in trying to correlate spectrographic data with plating results.

PLATING EFFICIENCY TESTS

These tests were performed as a routine check on each lot in order to gather data on the variations to be expected. From a functional standpoint, an efficiency check was required only when completely new baths were made up for production plating. This was necessary in order to set the ampere-hour meters at the proper values. From this point the ampere-hours required for plating a piece were adjusted as indicated by Sheffield gage measurements after plating. If the gage readings showed the plating to be on the low side of the range, the ampere-hour meters were set accordingly. Thus, a decrease in efficiency in a bath was compensated for whether due to a buildup of impurities, acid concentration, or a transition to a different batch of rhodium (with a slightly different efficiency).

On new baths (10 g/l Rh and 25–35 ml/l of added sulfuric acid) the efficiencies at 15 amp/ft^2 normally ranged from 85–98 per cent, and occasionally dropped to 80–84 per cent.

HULL CELL TESTS

These tests were run in a 300 ml cell using polished brass or copper panels. The conditions employed were:

Temperature	120° ± 2° F
Current	2 amp
Time	5 minutes
Agitation	Stirring rod oscillated in front of cathode

From the appearance of the panels, it was possible to predict reasonably well if the batch had satisfactory plating characteristics. Extensive use of the Hull cell was made later to study the effects of additives. In most cases the tests made paralleled the results obtained with larger volumes of solution and longer plating times. The notable exception was seen in the case of copper added to rhodium solutions.

Fig. 3 shows Hull Cell panels from 6 lots of rhodium. The differences in reflectivity are apparent.

It should be pointed out that in our application the rhodium was being applied for a bearing surface. As such, the basic requirements for the deposit were: (a) excellent adhesion, (b) smoothness (c) hardness (d) relatively uniform distribution. Brightness, or color uniformity were not as important factors as they would be in decorative work.

STRESS IN RHODIUM DEPOSITS

For this phase of the program, the Brenner-Senderoff Spiral Contractometer[2] was employed. The apparatus was modified in several respects in order to adapt it to measurements in rhodium solutions, as well as to fit special requirements.

The first modification consisted of replacing the laminated phenolic helix supports with solid Plexiglas members. This eliminated any possible leaching out of the phenolic resin and resultant contamination of the rhodium solutions. It was pointed out in the previous paper that rhodium solutions are extremely sensitive to certain organic contaminants.

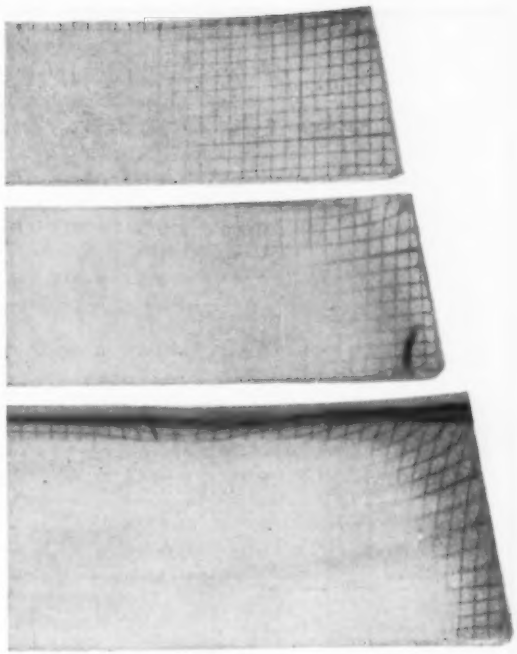


Fig. 3. Hull Cell Panels Showing Differences in Reflectivity of Various Lots

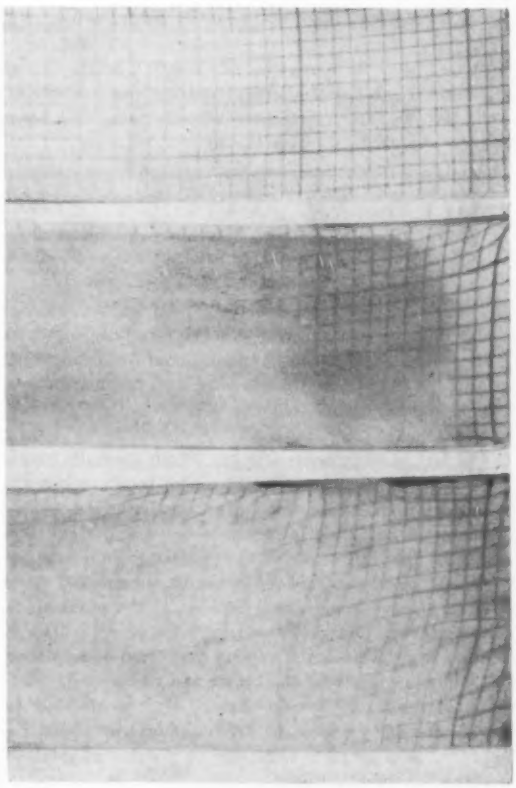


TABLE I

Lot No.	Per cent Cu	Per cent Pb	Per cent Fe	Per cent Al	Per cent Mg	Per cent Ca	Per cent Na	Per cent Ag	Per cent Pd	Per cent Si	Notes on Deposits Obtained
1.	0.000X	0.00X	0.000X	0.00XL	0.00X	0.000X	0.0X	N.F.	N.F.	N.F.	Very Bright, Stressed
2.	0.000XH	N.F.	0.000X	0.00X	0.00X	0.00X	0.0X	N.F.	N.F.	N.F.	Bright, Good results
3.	0.00X	N.F.	0.00X	0.00X	0.00X	0.00X	0.0X	0.000X	0.00X	N.F.	Bright, Good results
4.	0.0XH	N.F.	0.000X	0.000X	0.00X	0.00X	0.0X	0.000X	N.F.	N.F.	Bright, excellent results
5.	0.000X	N.F.	0.000X	0.00XL	0.00X	0.00X	0.0X	N.F.	N.F.	N.F.	Dark deposit, fair results
6.	0.00XH	N.F.	0.000X	0.00XL	0.00X	0.00X	0.0X	N.F.	N.F.	N.F.	Bright, good results
7.	0.00XL	0.0X	0.000X	0.00XL	0.00XL	0.00X	0.X	N.F.	N.F.	N.F.	Dark Deposit, poor results
8.	0.000X	N.F.	0.000X	0.00XL	0.000X	0.000X	N.F.	N.F.	N.F.	0.000X	Very dark deposit, poor results
9.	0.000X	0.00X	0.00X	0.00X	0.00X	0.00X	N.F.	N.F.	N.F.	0.00X	Dark Deposit, fair results
10.	0.00XL	0.00X	0.000X	0.00XL	0.00X	0.00X	0.0X	0.000XL	N.F.	0.00X	Dark rough deposits

X = may be 1 to 9. 0.00X means impurity is present in range of .001–.009 per cent
XL = Indicates impurity is on low side of range
XH = Indicates impurity is on high side of range
N.F. = None Found.

TABLE I
Typical Ranges of Impurities in Various Lots of Rhodium Concentrate Received—Plating Results Are Also Given

The second modification that followed was replacement of the stainless steel torque rod housing and bearings with a Plexiglas unit. This was brought about by the fact that during one of the runs this stainless steel member became bi-polar and contaminated the solution with chromium, iron and nickel.

The last major change was one which normally would not have been made had the instrument been employed in nickel or chromium solutions. In these baths the volume employed is not a big factor since the cost per gallon is relatively low. However, in a 40 g/gal rhodium bath (at $240/gal) consideration of the minimum volume that could be used became important. Because of the physical dimensions of the instrument and the helix, about 3 liters of solution was the minimum volume that could be employed and still allow space for the heater and thermostat, cylindrical platinum anode and stirrer. It was decided to shorten the helices (and the helix support) by about 1.5 inches, thus allowing a reduction in volume of solution needed to about 1.75 liters.

The change to a shorter helix required that comparative measurements be made in the same bath in order to establish the validity of such a move. It should be pointed out also that although the desirability of such a modification was recognized at the outset, a large number of measurements were made on nickel and rhodium solutions with the standard length helices in order for the authors to become thoroughly familiar with the instrument and the variables that might affect the results. The modified apparatus with standard length and shortened helix are pictured in Fig. 3A.

PROCEDURE FOR MAKING STRESS MEASUREMENTS

The equipment and the derivation of equations involved are very ably covered by Brenner and Senderoff[3] and only the basic equations employed in this work are listed below:

$$(1)\quad S = \frac{2K}{pt} \times \frac{D}{d}$$

S = stress in psi
K = spiral constant expressed in inch pounds/degree

p = pitch of helix
t = thickness of helix material in inches
D = deflection in degrees due to stress in deposit.
d = average thickness of metal deposited.

From the data obtained in calibration of a helix, the modulus may be calculated by the following formula:

$$(2)\quad E = \frac{2.16 \times 10^4\ KCh}{p^2t^2}$$

E = Young's Modulus
C = outside diameter of helix when compressed to make a cylinder
h = height of section on helix which is plated (compressed height)

If equation (2) is solved for K and this value substituted in (1) an equation for stress (S) results which is independent of the spiral constant K.

$$(3)\quad S = \frac{2Ept^2}{2.16 \times 10^4\ Ch} \times \frac{D}{d}$$

Since copper spirals were employed entirely in this work, it was possible to further simplify the equation by substituting a value of 16×10^6 for E. The final equation then became:

$$(4)\quad S = \frac{1.48 \times 10^2\ pt^2}{Ch} \times \frac{D}{d}$$

The basic procedure for cleaning and stopping off the spirals was the same as recommended by Brenner and Senderoff. After mounting and calibrating the spiral, it was dipped 10–15 seconds in an electrocleaner, rinsed, dipped in 1:1 hydrochloric acid, and then given a two minute Wood's Nickel strike at 150 asf. The spiral was rinsed, dipped in 2 per cent sulfuric acid, the indicator was then set at zero, and the area to be plated was lowered into the rhodium bath with the current on. Readings were taken every five minutes during the plating cycle. Normally the time was calculated to give a rhodium thickness of 0.0002–0.0003 inches. The current density employed was 15–18 amp/ft², and the temperature of the bath was thermostatically held at 120° ± 2° F unless otherwise stated.

TABLE II

Solution		Average Thickness of Rhodium	Stress, 1000 psi (S_K)	Stress, 1000 psi (S_E)	Ratio SE/S_K
Lot 4 (New)		0.00026 inch	123.0	116.5	0.945
		0.00026 inch	134.0	103.0	0.779
		0.00025 inch	134.0	117.0	0.873
		0.00027 inch	146.0	105.0	0.721
		0.00030 inch	117.0	86.5	0.733
	Av.	0.00027 inch	131.0	105.5	.....
Production Solution After 150 Amps. Hrs. Per Gal. Operation		0.00028 inch	119.5	96.0	0.800
		0.00025 inch	158.0	118.0	0.748
		0.00027 inch	159.0	129.5	0.815
		0.00027 inch	134.0	114.5	0.855
		0.00025 inch	102.0	101.5	0.992
		0.00029 inch	168.5	127.0	0.755
		0.00026 inch	130.0	110.5	0.853
	Av.	0.00027 inch	131.5	114.0	.....
		0.00014 inch	152.0	103.0	0.743
		0.00014 inch	157.0	104.0	0.723
		0.00014 inch	156.0	116.0	0.743
	Av.	0.00014 inch	151.7	108.0	.....

NOTES: S_K = Stress Calculated Using Spiral Constant.
S_E = Stress Calculated Using Equation (4).

TABLE II
Reproducibility of Stress Measurements in Rhodium Baths

One of the first checks made was to determine the reproducibility of the measurements in any one solution. Table II shows the results of five measurements on a 10 g/l bath made from lot 4 concentrate, and 10 measurements on a production bath (made from lot 4 concentrate) after about 150 amp-hr/gal operation.

TABLE III
Calibration Data for Six Copper Helices and Calculation of Young's Modulus

Spiral No.	h inches	C inches	p inches	t inches	K x 10^{-4} 28.4 g	K x 10^{-4} 50 g	K x 10^{-4} 78.4 g	Avg. K x 10^{-4}	E x 10^6
1	4.56	0.765	0.750	0.0167	7.92	7.92	7.85	7.89	22.7
2	4.44	0.773	0.750	0.0167	8.12	8.10	7.97	8.06	22.4
3	4.59	0.792	0.750	0.0166	7.36	7.42	7.28	7.35	22.1
4	4.44	0.759	0.750	0.0167	7.72	7.86	7.67	7.75	21.5
2a	3.78	0.777	0.750	0.0167	9.2	9.02	8.98	9.07	22.0
3a	2.94	0.795	0.750	0.0166	11.2	11.0	10.8	11.0	21.2

The data indicate rather large variations in the stress values calculated employing the spiral constant K (column designated in the table as S_K). The stress values were also calculated using equation (4). These data are recorded in the column S_E. As will be observed, these figures, in most cases, are considerably lower. Further, the ratios between the two sets of figures indicates that the discrepancy is not a constant error.

It was obvious from the data that a single stress measurement would not serve to establish a value for a particular lot of rhodium concentrate or for a production bath. Brenner and Senderoff pointed out in their article that there were factors in the plating (such as cracking of the deposit) which were uncontrollable and were responsible for certain discrepancies.

In an effort to improve the accuracy, the instrument was dismantled and checked for points of friction. Gears were coated with molybdenum disulfide and baked. Bearing surfaces, where permissible, were coated with a thin layer of molybdenum disulfide grease. Four spirals from a different shipment were calibrated with three different weights after preparing them in the normal manner, and Young's Modulus was calculated using equation (2). Spirals 2 and 3 were shortened by use of a cut-off wheel and recalibrated. The data are recorded in Table III. While an improvement in the consistency of the results was obtained, the values for E were considerably above the accepted value of 16×10^6.

In preparing the spirals, it was not unusual to perform the lacquering in the inside and allow the spirals to stand overnight or for several days. (The weight of the lacquer ranged from 0.020–0.045 grams per helix). Sometimes, however, they were used within a matter of two hours after preparation. Since trouble had been experienced in production operation with traces of solvent remaining after fabrication of Plexiglas tanks, it was decided to bake the spirals for one hour at 150–160°. The removal of the last traces of solvent and possibly the slight stress relieving of the spirals was responsible we believe, for the improved agreement between the S_K and S_E in subsequent runs.

Table IV illustrates this improvement as well as several other points. As in Table II, ten measurements were made on one solution. Six of the measurements were made with short spirals (see column headed "h") and four with the standard length spirals. The agreement, we believe, is acceptable. The data also indicates that the stress values tend to drop as the thickness of the deposit increases. This tendency, however, may vary appreciably in different batches of rhodium concentrate as may be seen in Figure 4. The effect of the thickness of the deposit upon the stress values obtained in baths made from five lots of rhodium concentrate is shown. Taking an arbitrary thickness value of 0.0002 inches, for example, the stresses ranged from about 20,000 psi in lot 8 to 120,000 psi in the case of lot 4. An attempt is made in Table V to summarize some of these data in relation to the type of deposit obtained and the general plating results.

Although no sharp ranges are apparent, from our experience to date, the following general relationships between stress values and quality of the rhodium deposit seem to apply in the range of 0.0002–0.0003 inches thickness.

STRESS VALUES	QUALITY AND TYPE OF DEPOSIT
20,000–40,000 psi	Rough, dark
40,000–65,000 psi	Somewhat rough and dark
65,000–100,000 psi	White to bright, smooth deposits

Effect of Length of Helix and Thickness of Deposit on Stress Values in Production Rhodium Bath

TABLE IV

Run No.	Solution	Helix No.	h in	C in	p in	t in	K x 10^{-4}	S_K x 10^3 psi	S_E x 10^3 psi	d = thickness of deposit x 10^{-4}	E calc. x 10^6
5	Lot	1	3.16	0.777	0.750	0.0168	10.7	136.5	103.0	1.5	21.2
6	5	2	3.16	0.776	0.760	0.0173	10.45	118.5	102.5	1.3	18.5
7	After	3	3.16	0.804	0.750	0.0170	8.42	110.0	105.5	1.3	16.7
8	Removal	4	4.53	0.777	0.750	0.0167	6.5	124.0	105.0	1.8	18.9
9	from	5	4.50	0.783	0.750	0.0170	6.6	121.6	106.5	1.8	18.3
10	prod'n	6	4.38	0.771	0.760	0.0169	6.59	110.0	103.0	1.5	17.2
	Plating Tank	Avg.						120.1	104.3	1.5	
12		7	3.16	0.769	0.782	0.0172	9.75	102.0	99.3	2.7	16.5
13		8	2.81	0.798	0.760	0.0168	9.37	93.2	89.6	2.7	16.6
14		9	2.78	0.787	0.781	0.0168	9.65	91.5	92.6	2.7	15.8
15		10	4.41	0.788	0.750	0.0169	6.54	95.5	84.1	3.2	18.1
		Avg.						95.5	91.4	2.8	

The stress values quoted above are S_E figures (using equation 4) with no special addition agents added. Some shifting of these ranges to higher values may occur depending upon the amount of operation or electrolysis that has occurred. For example, if a bath as made up shows a stress of 40,000 psi and dark Hull cell and efficiency panels, it may improve (after 10–30 amp-hr/gal) to obtain a stress value of the order of 60,000–65,000 psi and whiter deposits. This improvement with electrolysis is a common occurrence in plating baths and is the reason for "dummying" new solutions.

A question that might logically be asked after examination of the above figures is: "What stress value is required to exceed the bond strength and cause flaking of the deposit?" This was one of the points we were seeking an answer to in these studies. The impossibility of reproducing production preplating cleaning and etching techniques with the spiral contractometer and the variation in stress-thickness patterns (Fig. 3) made this a difficult question to answer. Production baths in which flaking of the deposit was occurring were checked on several occasions. Stress figures in the range of 125–145,000 psi were obtained yet no flaking occurred on the copper spirals.

THE EFFECTS OF INORGANIC ADDITIVES IN RHODIUM BATHS

COPPER:

As was mentioned earlier, the spectrographic analyses of the various lots seemed to indicate baths with very low copper gave poorer results. The presence of lead in the concentrate also seemed to be detrimental.

The effect of copper additions to a rhodium bath was investigated in the range of 10–1000 mg/l Cu. Fifteen minute efficiency panels were plated at 15 amps/ft² and 5 minute Hull cell panels were run at 2 amp. The changes observed in the 15 minute panels with increasing copper additions are summarized in Table VI.

Hull cell panels were mirror bright from end to end with copper concentrations of 500 mg/l and above. Considerable cracking and crazing of the deposits was observed in panels plated from baths containing 800–1000 mg/l of copper. No appreciable change in the efficiency of the bath was noted with copper additions up to 1000 mg/l. With these encouraging results (which were checked on several lots of rhodium), it was decided to try additions to a production bath which was giving rough, dark deposits. These were made in increments starting at 250 mg/l, and the results were noted. No improvement in the deposit was observed after a total of 1000 mg/l had been added. A sample of this bath run in a Hull cell gave a mirror bright deposit from end to end. The most plausible explanation for the discrepancy in the results is the anode to cathode ratio that existed in our plating tests and in the production plating setup. In the former case the anode/cathode ratio ranged from 1:2 (Hull cell) to 3:1 (10 min panels) whereas on production parts the ratio was closer to 1:7–1:10. Presumably, the more highly oxidizing conditions that existed in the production tanks had an adverse effect upon copper as a brightener. In installations where a more favorable anode-cathode ratio exists, copper may prove to be effective as an addition agent. However, it should be carefully checked in each particular case.

TABLE V

Lot No.	Average Thickness in Inches	Average Stress, 1000 psi-S_K	Average Stress, 1000 psi-S_E	Notes on Deposits and Plating Results
4	0.00027	131.0	104.3	Excellent results. Bright deposits.
5	0.00026	48.4	45.4	Dark deposit, fair results.
8	0.00024	19.9	18.9	Very dark deposits. Poor results.
10	0.00024	54.4	50.4	Dark deposits, fair results.
11	0.00022	66.5	67.5	Excellent results. White, smooth deposits.
12	0.00031	75.0	55.0	Dark deposits. Fair results.

Stress Measurements on Various Lots of Rhodium
10g/l Rh—25ml/l H_2SO_4 Added
Temp—120° F ± 2°—Agitated Solution

TABLE VI

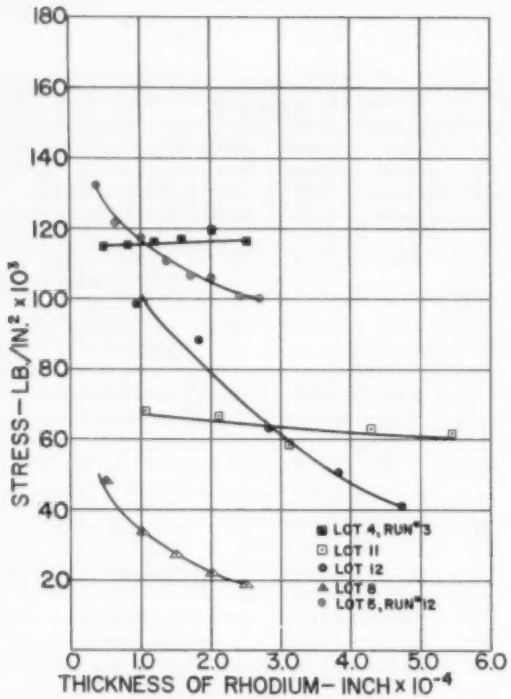
Copper Added mg/l	Effect on Rh Deposit
10–100	Darkened deposit appreciably.
100–200	Deposit dark, but smooth.
200–300	Whitened deposit.
300–1000	Brightened deposit.

Effect of Copper Additions in a Rhodium Sulfate Bath on Type of Deposit Obtained

TABLE VII

Concentration Phenol Sulfonic Acid mg/l	Efficiency mg/amp min	Per Cent Efficiency
0.	20.9	98.5
2.5	19.2	90.3
5.0	18.8	85.5
7.5	18.4	86.5
10.0	18.5	87.0
20.0	17.9	84.2
50.0	16.8	79.0
100.0	14.9	70.0
200.0	11.2	52.6

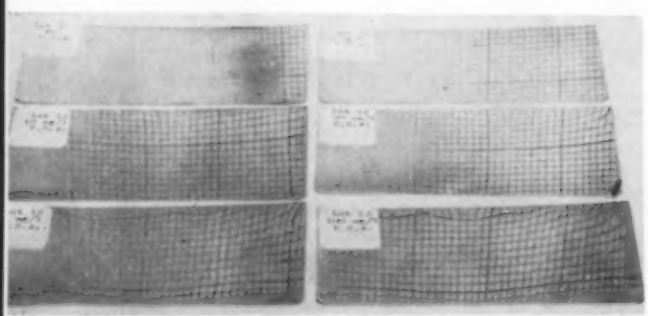
Effect of Phenol Sulfonic Acid Additions on Efficiency of a Rhodium Sulfate Bath
Rh—10 g/l H_2SO_4—35 ml/l
Temp—120° F C.D.—15 asf



Above: **Fig. 4.** Effect of Thickness of Rhodium Deposited Upon Stress in Several Rhodium Baths

At left: **Fig. 3A.** Modified Spiral Contractometer with Plexiglas Components. Standard Length and Shortened Helices Are Also Shown

Below: **Fig. 5.** Hull Cell Panels Showing the Effect of Phenol Sulfonic Acid Additions to a Rhodium Bath



LEAD:

Reid has claimed in U. S. Patent No. 2,577,365 the use of lead (0.001–0.02 g/l) as a brightener in rhodium baths. The maximum thickness plated, however, was 0.00005 inches. To check the effectiveness of lead as a brightener in heavier thicknesses, additions of lead (as acetate) in concentrations of 1, 2, 5, and 10 mg/l were made to a rhodium bath and 15-min panels were plated at 15 asf. Hull cell panels were also run after each of the additions. No detrimental effect upon the cathode efficiency was noted within the range explored, however, no improvement in the deposit was observed. The 15-minute deposits all showed a lead-grey appearance. The Hull cell panels showed a progressive darkening at the low current density end. From these experiments, we may conclude that lead is not an effective brightener in concentrated rhodium sulfate baths for relatively thick deposits. Rather, we feel that its presence is harmful. In addition to copper and lead a number of metallic ions such as cobalt, nickel, silver and zinc were tried but were found to be either ineffective or detrimental in a rhodium solution. These results are in agreement with Laister and Benham, who also studied the effects of tin and mercury.

PHENOL SULFONIC ACID AS AN ADDITION AGENT* IN RHODIUM SULFATE SOLUTIONS

It was felt that further work was necessary in our application to improve the quality of the deposit, since we were faced with the problem of what to do with a bath that was giving rough or flaking deposits. If a particular lot was giving rough deposits, the bath could often be kept operating by proportioning additions from a satisfactory batch. If the deposits from a bath were flaking and the stress values were high, we had no alternative except to remove the solution and replace it with a new one. The use of small additions of chloride ion was sometimes effective but not always, and it tended to cause rough deposits in the long run. The desirability of having an addition agent, (or agents) which would relieve stresses and/or improve smoothness was obvious. The authors' experience with organic addition agents in general had been relatively unsatisfactory. The use of Versene† had been explored as a means of purifying or masking impurities. The efficiency of the solution was reduced appreciably without always producing a satisfactory deposit. Consideration was given to other acid baths comparable to rhodium and the addition agents employed. This line of thought led to a study of organic addition agents employed in acid copper sulfate solutions. One which was recommended by R. O. Hull and W. Blum[4] was phenol sulfonic acid. Reid[5] had also recommended the use of phenol as an addition agent in concentrations of 0.07 to 0.5 g/l in dilute rhodium baths.

Phenol sulfonic acid was prepared by sulfonating USP Grade phenol. From this, a dilute solution containing 10 g/l phenol sulfonic acid in 5 per cent sulfuric acid was

* Patent applied for.

† Versene is the trade name for EDTA.

made. This solution was employed for making additions to the rhodium bath. The effect of phenol sulfonic acid (PSA) on the efficiency of a rhodium sulfate bath is shown in Table VII. During these runs it was learned that phenol sulfonic acid brightens rhodium deposits in relatively low concentrations. Baths made from Lot 12 rhodium concentrate were treated with increasing amounts of PSA. The improvement in the deposit may readily be seen from the series of Hull cell panels shown in Fig. 5.

Best results were obtained when the rhodium sulfate concentrate was taken to fumes after adding about 10–15 mg/10 grams of rhodium metal. The fumed solution was then diluted to the proper concentration for the regular additions to the rhodium plating tank.

Stress measurements were made to determine the effect of PSA additions upon the stress level of the deposits. These results are recorded in Table VIII. They indicate an increase in stress with increasing amounts of PSA, although conceivably a portion of this change could be experimental error in the stress measurements. The important factor was that no large increase in stress was produced through the use of PSA within the concentration range in which we were interested. This addition agent was useful then in correcting concentrates which when diluted gave somewhat rough, dark deposits.

GENERAL DISCUSSION OF RESULTS AND SUMMARY

The various phases of this investigation extended over a six to eight months' period and included sampling of 10–12 lots of rhodium sulfate concentrate ranging from 300–800 g/lot. It is felt that quality control measures as outlined above are valuable and essential if relatively heavy deposits of rhodium are being deposited, in order to maintain a reasonable uniformity in deposits and a minimum of rejections and plating difficulties. Hull cell panels run on new baths along with panels run under actual plating conditions were extremely useful in predicting the results with the various batches of rhodium concentrate.

Stress measurements using the spiral contractometer involve a considerable amount of work; and, it is the authors' feeling, that it is a research instrument as far as its applicability to rhodium solutions is concerned. The high stress values found in most cases necessitate a number of measurements before one can be reasonably certain of their validity. In appraising the two sets of figures S_K and S_E which have been reported in these studies, it is the authors' belief that the lower figures (S_E) probably represent the best values. The modulus of elasticity of copper remains constant under a wide variety of conditions; therefore, any stress results which when calculated back show a high value for E, must necessarily be in error.

The study of addition agents in rhodium baths and variations in methods of preparation of rhodium concentrate both are very fertile fields for study in relation to their effects on heavy deposits. The literature shows relatively few effective addition agents in rhodium baths. There are doubtless others which are even more effective than phenol sulfonic acid in promoting smoothness and whiteness in heavy rhodium deposits.

TABLE VIII

Conc. PSA Mg/l	Thickness of Rh in Inches	Stress 1000 psi S_E
0	0.00028	69.5
5	0.00028	67.8
10	0.00025	72.6
15	0.00029	80.4

The Effect of Phenol Sulfonic Acid Additions Upon Stress in Rhodium Deposits

Acknowledgement

The authors are indebted to Seymour Senderoff of the National Bureau of Standards for his comments and suggestions regarding the modification of the contractometer and his discussion of some of the data presented.

We are also appreciative of the permission of the Bendix Products Division of the Bendix Aviation Corporation to publish this work.

Bibliography

[1]H. J. Wiesner, Proc. Am. Elec. Soc. (1952)

[2]Frank Reid, U. S. Pat. No. 2,577,365 (1951) assigned to the International Nickel Co., Inc.

[3]A. Brenner and S. Senderoff, J. Res. Nat'l. Bur. Standards, 42, 89 (1949) RP (1953.) Also Proc. Am. Elec. Soc. 35, 53 (1948)

[4]R. O. Hull and W. Blum, J. Res. Nat'l. Bur. Standards 5, 767 (1932)

[5]Frank Reid, U. S. Pat. No. 2,577,364 (1951) assigned to the International Nickel Co., Inc.

[6]E. H. Laister and R. R. Benham, Trans. Inst. Met. Finishing 29, 181, (1953)

Harold J. Wiesner received his B.S. in physical chemistry in 1938 and PhD in 1943. Both degrees were granted at Michigan State. Worked two years at the R.C.A. Victor Division and three years at C. G. Conn Ltd, as a research chemist in the fields of electroforming, electroplating and electropolishing.

Joined the Bendix Products Division of Bendix Aviation Corp. in 1948.

Was a member of research project committee on Projects I and XI.

Won the Precious Metal Plating Award for paper published in 1952 Proceedings. Has held all offices in the AES St. Joseph Valley Branch and currently serving second term as Secretary-Treasurer. He is also a member of the Editorial Board.

Henry A. Meers received his B.S. degree from Butler University following undergraduate work at Notre Dame University. After service in World War II, Meers joined the Bendix Products Division of Bendix Aviation Corporation as a research chemist.

Active in the St. Joseph Valley Chapter of AES, Mr. Meers holds membership in the Notre Dame Chapter of ASM also.

ANALYTICAL DETERMINATION OF TRACE CONSTITUENTS IN METAL FINISHING EFFLUENTS

XII. The Determination of Orthophosphates in Effluents

E. J. SERFASS† AND R. F. MURACA*

THE FOLLOWING PAPER, THE TWELFTH OF A SERIES, IS A RESULT OF THE WORK SPONSORED AT LEHIGH UNIVERSITY BY THE AES AND THE OHIO RIVER VALLEY WATER SANITATION COMMISSION. WHILE THE ORIGINAL PROCEDURE WAS WORKED OUT UNDER AES SPONSORSHIP, THE MODIFICATION WAS DEVELOPED UNDER ORSANCO SPONSORSHIP, THE COMMISSION HAVING PLACED THE PROJECT AT LEHIGH SO AS TO BE ABLE TO UTILIZE THE BACKGROUND DEVELOPED BY AES PROJECT NO. 2. IT SHOULD BE NOTED THAT THE METHODS DESCRIBED IN THIS SERIES WERE TESTED, MODIFIED IF NECESSARY, AND RETESTED BY AT LEAST SIX AND SOMETIMES AS MANY AS TWELVE INDUSTRIAL LABORATORIES. AS A RESULT OF THIS, THE APPROVED FORM, AS PUBLISHED HERE, WAS DEVELOPED.

This colorimetric procedure for the determination of orthophosphates in effluents is a modification of the standard method recommended by the APHA.

The modifications are necessary so as to eliminate the interference of fluorides, arsenic, silica, and highly colored substances.

Briefly, the method makes use of a fuming with nitric and sulfuric acid to destroy organic materials and remove fluorides. Arsenic is then removed by repeated evaporations with hydrochloric acid and the phosphate content of the sample is precipitated as ammonium phosphomolybdate and removed from highly colored material by filtration. After dissolving away the ammonium phosphomolybdate from silica, it is reduced to molybdenum blue and the intensity of the color is measured.

The Determination of Orthophosphate in Effluents

The procedures for the determination of orthophosphate which have been presented in the literature generally use the formation of the highly insoluble, yellow precipitate of ammonium phosphomolybdat for the separation of the orthophosphate from other substances. When large quantities of the phosphate are present, a gravimetric separation is possible, but when only small quantities are present, a colorimetric procedure obviously must be employed. Since turbidimetric measurements of the precipitated compound are not as elegant as whem measurements can be carried out on colored solutions, most procedures for the analysis of small amounts of phosphorus involve the reduction of the insoluble ammonium phosphomolybdate to a soluble, blue compound of unknown structure. There exists great disagreement among chemists as to which reducing agent is the most effective and yields the most reproducible results. Although the authors have found that certain photographic developers of the amidol or metol class are superb reducing agents, it was decided that the 1-amino 2-naphthol 4-sulfonic acid recommended by the APHA would be more acceptable to other chemists than the reagents which reflect the whims of the writers.

† Head of Chemistry Dept., Lehigh University, Bethlehem, Pa.
* Group Leader, Analytical Chem. Dept., Jet Propulsion Lab., California Institute of Technology, Pasadena, Calif.

Description of the Method

The precipitation of ammonium phosphomolybdate in solutions which are strongly acid with nitric acid is nearly specific for orthophosphates. Only fluoride, arsenic, silica, and some organic materials interfere with the precipitation.

The sample of the effluent is fumed with nitric and sulfuric acids thereby causing the decomposition of organic matter and the simultaneous expulsion of fluorides. The arsenic content of the sample (which has been oxidized to arsenate by the nitric acid in the fuming steps) is reduced by the addition of potassium iodine and then volatilized by repeated fumings with HCl. The repeated fumings have incidentally caused the dehydration of the silica; this and all other insoluble substances are removed by filtration. Ammonium phosphomolybdate is then precipiated and filtered to separate it from substances which might interfere with the formation of molybdenum blue. The precipitate is dissolved, reprecipitated and then reduced. The intensity of the blue color is measured in a colorimeter or a spectrophotometer.

If the effluent contains organic matter which will decompose and form orthophosphoric acid, the results of the analysis will also include this phosphorus.

Recommended Procedure

This procedure is designed to be used for the determination of orthophosphates in effluents in the range of 5 to 50 ppm. in the presence of a maximum of 500 ppm.

of each of the common cations, and organic material. With the exception of the preliminary treatment steps, the procedure is identical with that presented in "Standard Methods for the Examination of Water and Sewage," Ninth Edition, 1946.

Reagents Required

(1) **Sulfuric Acid:** Conc., 36N, reagent grade.
(2) **Nitric Acid:** Conc., 16 N, reagent grade.
(3) **Hydrochloric Acid:** Conc., 12 N, reagent grade.
(4) **Potassium Iodide Solution:** 10 per cent w/v; dissolve 10 g of the salt in 100 ml water.
(5) **Ammonium Molybdate Solution:** Dissolve 75 g of $(NH_4)_6Mo_7O_{24}.4H_2O$ and 75 g of Ammonium nitrate in 900 ml of distilled water. Cool, add 60 ml of conc. ammonium hydroxide and dilute to 1 liter. Filter the solution before using.
(6) **Ammonium Nitrate:** Use reagent grade crystals.
(7) **Nitric Acid, 1:100:** Dilute 1 ml of conc. nitric acid with 100 ml of water.
(8) **Ammonium Hydroxide, 1:1:** Dilute one volume of conc. ammonium hydroxide with an equal volume of water.
(9) **Sulphuric Acid, 1:4:** Dilute one volume of conc. sulfuric acid with four volumes of water.
(10) **Amino-Naphthol Solution:** Grind 0.5 g 1-amino 2-naphthol 2-sulfonic acid, take up with 5 ml of sodium sulfite solution (20 g sodium sulfite per 100 ml) and dissolve in 195 ml of sodium motabisulfite solution (150 g. $NA_2S_2O_5$ per liter). Do not use an amount of sodium sulfite greater than necessary to get the amino-acid in solution since it makes the solution less stable. Heat the solution, if necessary, to 50°–60° C. to hasten dissolving. Keep the solution in a dark stoppered bottle and prepare fresh every two weeks. Use the purified grade of the amino-acid since the technical quality will not give satisfactory results.
(11) **Standard Phosphate Solution:** Dissolve 71.64 g of dry potassium dihydrogen phosphate and dilute to 1 liter with water.

1 ml = 0.50 mg phosphate

Procedure

(1) Pipette 100 ml of the effluent into a 250 ml flask. In running a blank, use 100 ml of distilled water. In establishing a calibration curve, use 1 ml of the standard phosphate solution for each 5 ppm of phosphate and then add enough distilled water to make a total of 100 ml.
(2) Add 10 ml of concentrated sulfuric acid and 5 ml of concentrated nitric acid to the contents of the flask. Slowly bring the solution to boiling and continue heating until fumes of sulfur trioxide are copiously evolved. Fume for at least 5 minutes. If the liquid in the flask is discolored from organic decomposition products after fuming, cool the contents, add 5 ml more of concentrated nitric acid and again bring to fumes. Repeat, if necessary until all organic matter has been decomposed. Do not allow the solution to go to dryness; add sulfuric acid if necessary.
(3) Cool the residue in the flask. Add about 25 ml of water and cool again.
(4) Add 5 ml of potassium iodide solution and bring to a boil. Boil about 5 minutes or until iodine vapor ceases to come off.
(5) Add 10 ml of concentrated hydrochloric acid and boil down until fumes of sulfur trioxide are about to come off.
(6) Cool; then add 10 ml of concentrated HCl and again boil down to fumes of sulfur trioxide.
(7) Cool; then add about 25 ml of water and filter the solution through asbestos, fine sintered glass, or sintered stainless steel. Wash the filter with small portions of water. Combine the washings and the filtrate.
(8) Dilute the filtrate and washings to about 75 ml. Add 20 ml of concentrated nitric acid, 1 g ammonium nitrate, and heat to 80°C.
(9) Add 15 ml of ammonium molybdate solution and stir until precipitation begins. Digest the precipitate for 1 hour at a temperature of 40°C.
(10) Filter the precipitate and wash twice with 5 ml portions of 1:100 nitric acid. Reject the filtrate and washings.
(11) Dissolve the precipitate in the filter with 10–25 ml of 1:1 ammonium hydroxide. Catch the filtrate in a 100 ml volumetric flask.
(12) Add about 25 ml of water and 5 ml of ammonium molybdate solution.
(13) Add 1:4 sulfuric acid until the yellow color of the phosphomolybdate appears; then add 1 ml more of 1:4 sulfuric acid.
(14) Add 5 ml of the amino-naphthol solution and dilute to 100 ml with distilled water.
(15) Allow to stand 5 minutes.
(16) Read the color intensity of this solution using water as a reference liquid on a colorimeter equipped with a red Wratten filter No. 66 or with a spectrophotometer at 820 millimicrons.
(17) If necessary, convert the scale reading of the photometer to extinction. Subtract the blank reading from the sample readings. If a calibration curve is being established, plot these corrected readings: versus ppm of orthophosphate added. If a sample is being run, read the amount of orthophosphate present from the calibration curve.

Variations of the Recommended Procedure

When the composition of the effluent is known the recommended procedure can be altered to suit particular samples.

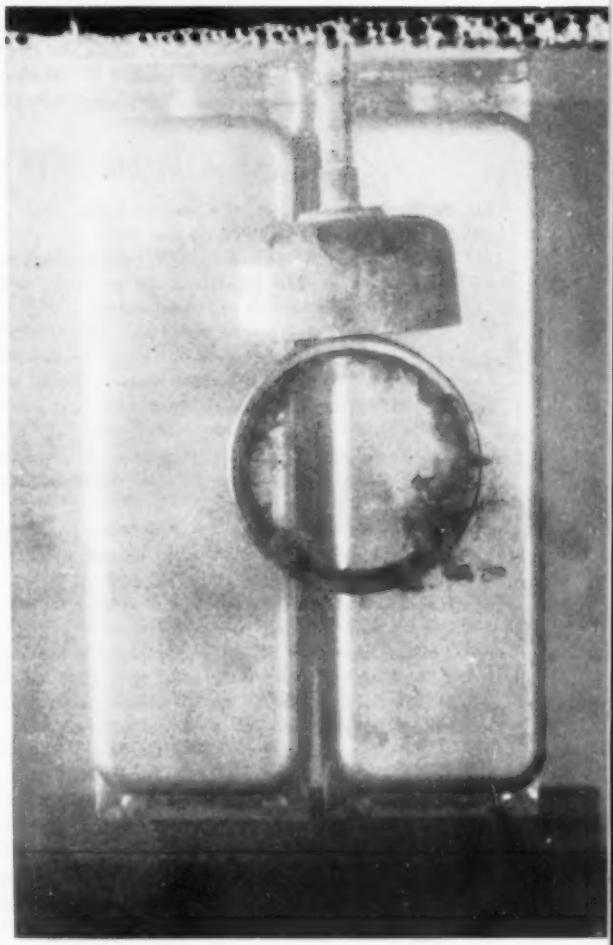
The following table summarizes the changes which can be made in the recommended procedure when the composition of the sample is known. When organic material that is liable to complex phosphorous compounds or molybdenum is absent and when the arsenic and silica content is negligible (say below 1 ppm each), the lengthy procedure which has been presented reduces to the simple

procedure recommended by the APHA (*loc. cit.*). Unless otherwise stated, the concentration of each element must not exceed 500 ppm.

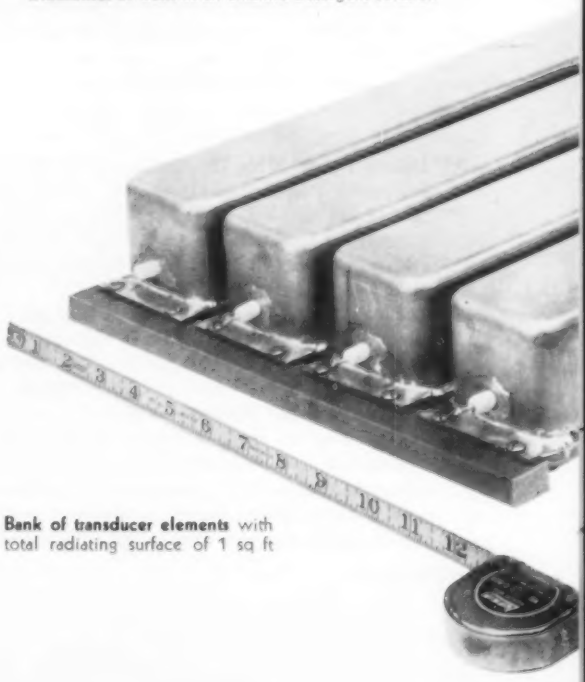
Composition of the Effluent	Changes in the Recommended Procedure
Organic matter absent.	Omit steps 2 and 3. Reduce the 100 ml. sample to about 15 ml. and add 10 ml. of conc. H_2SO_4 before starting with step 4.
Arsenic "Absent"	Omit steps 3, 4, 5, and 6.
Organic matter, arsenic, and silica "Absent."	Omit steps 2 to 7 inclusive. Between steps 1 and 8, make the sample acid with H_2SO_4 and reduce the volume to about 75 ml.
Organic matter, arsenic and silica "absent" and all elements except Ca, Al, Na, K, NH_4, Mg, Zn, and Cd are below 2 ppm (i.e. solution is colorless):	Pipette two 50 ml samples of the clear effluent into a 100 ml volumetric flask. Add one drop of phenolphthalein indicator and make the solution just acid by the use of ammonium hydroxide or sulfuric acid. Now add 1 ml more of 1:4 sulfuric acid. Start with step 14 of the recommended procedure.

Dr. Earl J. Serfass, a recognized authority in the fields of chemistry, electrochemistry and metallurgy, served two consecutive terms as chairman of the important AES Research Committee. He is presently compiling for the AES a "Process Control Handbook." Recently he worked in cooperation with the Ohio River Valley Sanitation Commission which has just released a book on "Procedures for Analyzing Metal-Finishing Wastes," incorporating the results of AES project 2 at Lehigh University.

Dr. Ralph F. Muraca has been a regular contributor to Plating. He was an assistant professor in the department of chemistry at Lehigh University until August 1, 1955 and was more recently associated with an AES committee which studied the style and format of Plating. Dr. Muraca worked in cooperation with the ORSANCO committee on metal finishing wastes which recently published the bookon "Procedures for Analyzing Metal-Finishing Wastes." This report incorporates results of AES Project 2 at Lehigh University with which he was also associated. Dr. Muraca is presently group leader, Analytical Chemistry Department, Jet Propulsion Labs at California Institute of Technology. (Div. of Cal. Tech.)



Ultrasonics at work in an alkaline detergent solution



Bank of transducer elements with total radiating surface of 1 sq ft

Immersible transducer with a ceramic element hermetically sealed in Type 316 Stainless Steel. Surface area is 15 sq in

ULTRASONIC CLEANING

By Frank Hightower†

In the metal fabricating and finishing industries, ultrasonics is an accepted tool that can be used to test for flaws, measure thickness, machine and drill hard materials, and clean surfaces. This report concerns new developments for cleaning.

Ultrasonic techniques applied to the usual cleaning baths will improve their performance so as to get the same job done with fewer cleaning stages or a shorter cleaning cycle. Use of ultrasonic power also makes it possible to clean inside hollow parts and deep recesses. It eliminates hand brushing or swabbing.

In mechanized lines with one or more properly designed ultrasonic stages, all pieces come through uniformly cleaned. Work coming off during the last hour of a shift is cleaned to precisely the same degree as that put through in the first hour, and there is no rehandling due to inadequate or uneven cleaning of the parts.

Until recently, industrial applications of ultrasonic cleaning were restricted by the fact that the available large-area transducers could only be used in non-conductive solvents. However, many very successful installations were made that had such transducers in a liquid chamber ahead of a vapor degreaser, principally to clean components before assembly.

Within the past year transducers have been developed that can, and do, operate in water and in water solutions of detergents or alkaline cleaners. A steel housing, usually of Type 316 stainless, completely encases a piezo-electric ceramic. These have brought ultrasonics into the field of cleaning for plating.

Industrial transducers of this type are made as standardized units that can be assembled in suitable groups to provide any cleaning area required. The dimensions of the radiating face give a fairly close measure of the size of the piece that can be cleaned effectively. The width of

† Applications Engineer, Branson Ultrasonics Co.

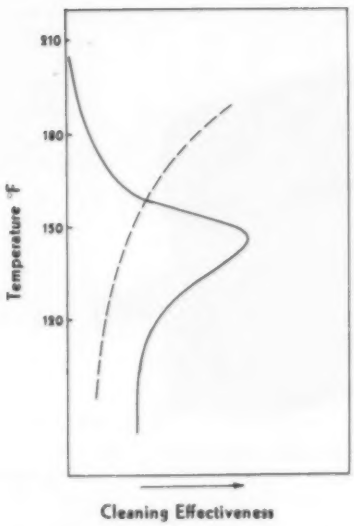


Fig. 1 Effect of temperature on cavitation.

Solid line is plotted from data that show the relative loss of weight on a metal in plain water

Dash line represents the usual increase in cleaning effect with aqueous solutions, no ultrasonics

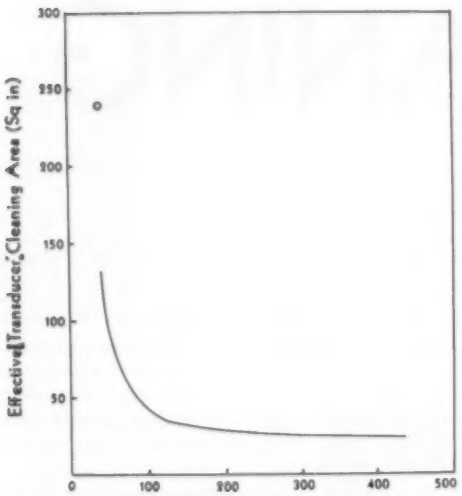


Fig. 2 Effective transducer area that can be driven by 1 kw rf power, at various frequencies

The curve is from actual commercial units having unenclosed barium titanate transducers

The circle shows the effective area per kw input achieved by the present type of steel enclosed ceramic transducer

the transducer surface should be at least as great as the width or diameter of the piece to be cleaned.

Generators are now in use that can drive banks of the transducers ranging in area from 30 sq in to over 10 sq ft.

Because sound waves travel in fairly straight paths the radiation from an array of transducer elements mounted on the side of a rectangular tank produces a cleaning zone of substantially uniform intensity. At the lower ultrasonic frequencies cavitation in water solutions will promote cleaning at distances of a foot or more from the transducer face, but there is some attenuation as the sound waves travel across a very wide tank and cleaning is more rapid when the surfaces to be cleaned are within five or six inches of the radiating surface.

It must be borne in mind that cavitation is a purely mechanical phenomenon and that its function in cleaning is to provide a gentle but very effective scrubbing action that will detach the dirt particles. Sound waves at low ultrasonic frequencies pass very easily through metals, plastics, glass and other homogeneous solids. When such a solid is introduced into the cavitation zone the sound energy reaching the surface toward the transducer is transmitted with substantially undiminished intensity through the solid, so that it causes cavitation in the liquid on the other side. Thus there is a scrubbing action on the whole surface of the piece from a single ultrasonic transducer surface. Scrubbing occurs also on interior surfaces, provided those surfaces are in contact with the cleaning liquid.

Although the greater portion of the incident sound energy is transmitted through the solid, there is sufficient loss due to reflection and absorption so that it is better to have ultrasonic transmitting areas on both sides of the tank for thick pieces or where very rapid cleaning is required, as in conveyor line operation.

There is no question of interference when such an opposing arrangement of transducer surfaces is used because it is the intensity and not the direction of the sound energy within the liquid that determines cavitation, and it is the cavitation at the metal-liquid interface that provides the scrubbing action.

Large pieces can be handled on hooks, mechanically or manually. Smaller parts that would normally be racked for plating can be racked, cleaned ultrasonically, rinsed and moved on to the plating tank. But if there is any

Transducer assembly to give a cleaning area 12 in x 48 in or 6 in x 96 in from one side of a tank, or 6 in x 48 in from both sides

other way to handle them, small parts should not be cleaned in baskets. It can be done, but we have found that small-mesh baskets may hinder or prevent proper cleaning, probably because the mesh intercepts and reflects too high a proportion of the sound waves.

If the parts to be cleaned have deep channels or blind holes that can entrap air, it is usually necessary to move the work about in the cleaner solution to permit the air to escape. Where there is no liquid in contact with the surface, there can be no cavitation and no cleaning.

Alkaline cleaners, compounded detergents, or other aqueous solutions used before plating will usually work better and faster with ultrasonics—but not always. In general, the first step is to try what you now use, unless there is some special reason for wanting to change. Ultrasonics should never be added to any cleaning operation without preliminary trials under the actual operating conditions contemplated.

There are two requisites for the cleaning liquid; it must provide good contact with the surface and it must have an initial effect on the soil. Then the cavitation can literally get behind it and push.

Given a suitable cleaning solution, the optimum operating temperature will be lower with ultrasonics than without. The effectiveness of the cavitation action is increased with an increase in the density and is lessened as the volatility increases. Thus, both of these influences tend to decrease the effectiveness of the cavitation as the temperature approaches the boiling point.

Cavitation effectiveness is one of the phenomena that have so far eluded easy and direct measurement. It is necessary to set up arbitrary criteria and use indirection. It is difficult to show the temperature effect quantitatively. Figure 1 reproduces a curve showing relative loss of weight when a metal was subjected to prolonged ultrasonic action in plain water at various temperatures. Below a critical temperature the curve follows the usual course of chemical reaction rates, and then the effectiveness falls off very sharply as the temperature increases above the point of inflection. The indication that cavitation is most effective in aqueous solutions within the temperature range of 110 to 160° F is supported by experience.

Ultrasonically activated cleaning at the proper temperature is usually more effective than cleaning with the same solution, without ultrasonics, at a higher temperature. If

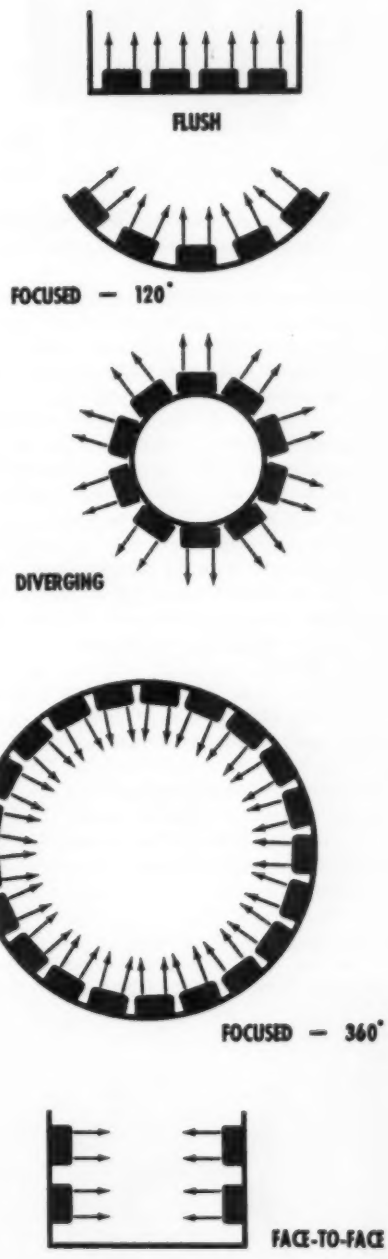
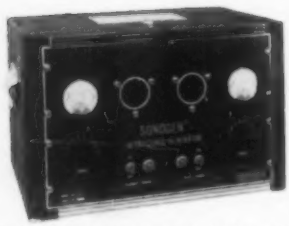


Diagram of typical transducer arrangements



Generator with ½ kw output at 36–40 kc, to drive transducer assemblies

for any reason it is considered necessary to operate above 160° F ultrasonic energy could contribute too little to justify its use.

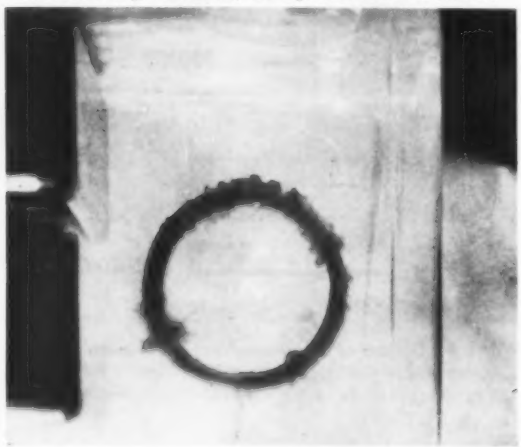
The same considerations of vapor pressure and density apply to any cleaning liquid. Relatively high density, high boiling chlorinated solvents are more effective as cavitation cleaning media than are the petroleum naphthas. The operating temperature range will be lower than for water, 90 to 120° F for instance, for trichlorethylene. Naphthas and emulsion cleaners may best be used with ultrasonics from room temperature to about 90 or 100° F.

Most of the new ultrasonic equipment operates in the vicinity of 40 kilocycles. Choice of approximately 40 kc as the operating frequency for the metal-enclosed transducers was based on practical considerations. Above this range much more electrical energy is required per unit of transducer area, to initiate and maintain cavitation. Frequency must be below about 50 kc for operating economy. (Fig. 2)

On the other hand, equipment that is to be operated steadily in the plating shop or elsewhere in the plant should not come too close to the upper limit of the audible range, 18 to 20 kc, for obvious reasons. Forty kilocycles is well and safely in the ultrasonic region.

Enclosed transducers at 40 kc provide a ten-fold increase in radiating surface per kilowatt of rf power, as compared to industrial equipment that was considered good in 1953–54.

Ultrasonic removal of soil from both inner and outer surfaces of a steel ring, immediately after generator was turned on



Generalized descriptions of specific cleaning installations that use ultrasonics do not help the man who is wondering whether he, too, should put it in. There are too many differences in shop practice. For instance, buffing compounds and their use, and material handling procedures. But there is no need to invest in large transducer areas in order to find out how they fit into any particular plating shop operation. One or two transducer units and a small generator will give experimental results that the equipment manufacturer can translate into large-scale installations. Such experiments should be carried out by any prospective user.

A few points should be noted:

Ultrasonics is best used in the final cleaning stage. It is always better to knock off any clumps of buffing compound or heavy grease and shop soil in a spray or jet washer first, then go into the ultrasonic stage.

Rinsing must be thorough and complete. Merely draining the parts or dunking them in a rinse tub once or twice is not enough. Ultrasonic action gets the dirt loose from the product but leaves it suspended in the cleaning liquid. Dragout on work leaving the ultrasonic stage will be contaminated with finely dispersed dirt that must be rinsed off.

And that leads to one other essential—adequate filtration. The ultrasonic cleaning solution must be filtered and recycled at a rate sufficient to keep the suspended soil at a low level. Ultrasonics cannot get clean work out of a dirty tank.

Questions, of importance to all of us, are "How do you measure cleanliness?" There is a continuing AES research project on this, and there are many suggestions in the literature, but we are still waiting for a simple, reproducible Test.

A reasonably accurate method is also needed for measuring the output of ultrasonic transducers in a cavitating liquid. There are somewhat devious ways of approximating it, but nothing really satisfactory. A yardstick for the measurement of cleanliness would do more than anything else to remove the empirical approach and put ultrasonic cleaning on a sound engineering basis.

Frank W. Hightower joined Branson Instruments, Inc., early in 1954 as staff engineer responsible primarily for industrial scale applications of ultrasonic energy to liquid systems. As background for this broad assignment he had spent several years in ultrasonic research and thirty years in chemical research, development and manufacture.

Major industrial connections prior to affiliation with the Branson organization included Barrett Division of Allied Chemical, Brush Development, Carbide & Carbon Chemicals, Goodyear Research, and Mellon Institute. His undergraduate studies were done at Texas Christian University and the University of Texas, and his graduate work at the University of Michigan led to a Ph.D. degree in chemical engineering.

Dr. Hightower is a member of the AES (Bridgeport Branch) and the American Chemical Society, as well as Sigma Xi, Tau Beta Pi and Iota Alpha.

HAROLD MICKELSON† and GENE E. OLSON*

FIXTURES IN BARRELS

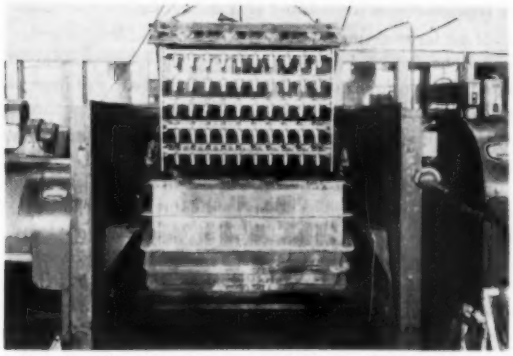


Fig. A. A yoke-type fixture which mounts 100 electric drill housing assemblies in position for finishing

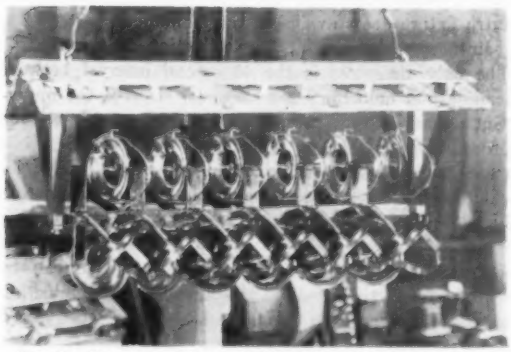
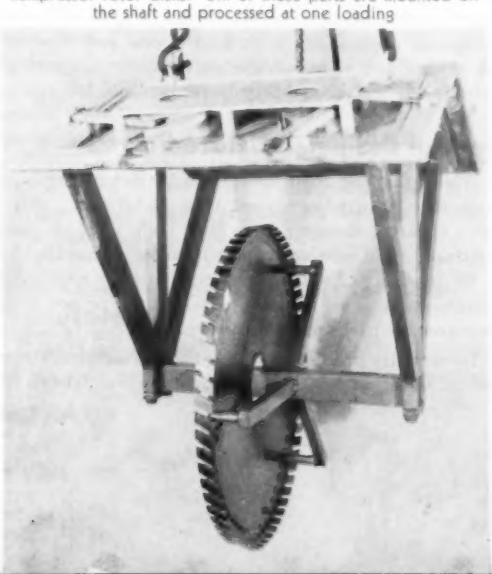


Fig. B. This type of fixture holds 24 stainless steel milking machine covers, each at an angle of 45° to horizontal axis of the barrel

Fig. C. Shaft-type fixture for processing jet aircraft engine compressor rotor disks. Six of these parts are mounted on the shaft and processed at one loading



. . . of fixture-type barrels for precision finishing large or intricate metal parts.

The fixture technique of barrel finishing is rapidly gaining in use for the preparation of large or delicate metal parts prior to plating, painting or end use. Applications of it are being made throughout the metal finishing industry in almost every instance where uniform, close tolerance work is required.

Recent developments such as new and better cutting chips and finishing compounds and improved equipment and procedures are providing finishing processes for various types of metal parts never before considered for barrel finishing. Now such operations as deburring, descaling, burnishing, forming radii, obtaining ultra-low microinch surfaces and removal of tool or chatter marks are performed on large or intricate parts in fixture-type barrels. The results have been absolutely uniform finishes, not obtainable by other methods. In addition to performing the above operations, there are many cases where internal burrs can be removed from machined parts where "blind" holes or elongated slots make hand tools inoperative.

To limit this discussion to special applications of barrel finishing, process variables such as selection of abrasive or burnishing media and finishing compounds, barrel rpm, time cycle and water level will not be included. Much has been written on the subject of barrel finishing processes but suffice to say here, most qualified process engineers could develop or obtain the correct finishing process for any given part.

Basic Problems in Dealing with Large Parts

The primary reason for fixturing parts in finishing barrels is to prevent part-on-part impingement or nicking during the work cycle. This hazard would involve any part that had sharp surface configurations, large, flat surface area, intricate shape or a combination of these characteristics. By mounting such parts on fixtures, they are held stationary inside of the barrel instead of sliding freely with the media mass as is the case in a standard barrel finishing procedure. Then during the process cycle, the abrasive media mass and finishing compound flow freely around and through the fixtured parts to obtain the desired finish.

† Chief Laboratory Technician, Almco Div., Queen Stone Works, Inc.
* Chief Engineer, Almco Div., Queen Stone Works, Inc.

While holding parts stationary is an important factor in designing proper fixtures, there are these variable factors that are equally important when analyzing a sample part for fixture-type processing. These variables are:

1. The size and shape of the part.
2. Finish specifications of the part.
3. Production requirements of the part manufacturer.

First of all, a careful study of the size and shape of the sample part is made to determine what type of holding device will be most satisfactory. It must be designed so that, if possible, no surface area of the part will be masked off. Too, it must provide firm support to the part to prevent it from coming loose during the process cycle.

Some of the types of fixtures most frequently used are simple arbors, posts, shafts, yokes, quick clamping bars and levers. To permit fast mounting and removal of the parts to be processed, none or few pivot points should be included in the completed fixture.

A good example of a simple fixture is shown in Fig. A. Here three components of an electric drill housing are placed together and set on a pilot or post. The assembly is then tightened in position by an adjusting screw. This fixture permits 100 assemblies to be finished simultaneously.

The correct spacing of the parts on the fixture is the next consideration. Parts cannot be so close together as to restrict the media flow; this would minimize the amount of deburring or finishing action. Also, if mounted too close together, media chips could lodge between adjacent parts and cause impingement. Here the engineer will consider the type and size of media chips being used in the finishing process to help determine how closely the parts can be mounted. He will then design the fixture to avoid these problems and yet hold a sufficient number of parts to meet the production requirements of the manufacturer.

A very important factor in obtaining the correct finish is the positioning of parts on the fixture. Where some surfaces of the parts require a faster cutting rate than on other surfaces, the parts are mounted at an angle to the flow of the media or chips. Note in Fig. B. how the steel milking machine covers are mounted at a 45° angle to the horizontal axis. In this position, the beveled inside surfaces of the covers receive greater abrading action than do other surfaces. The fixture design in this application utilizes the center holes of the parts in mounting.

On some flat, disk-shape parts such as gears, gyro frames and jet engine rotor compressor disks with irregular surfaces, parts are positioned at an angle to the verticle axis of the barrel. Corner breaks, pine tree slots and other difficult areas can then be precision finished to rigid specifications. This shape of part is generally mounted on a shaft-type fixture yoke such as seen in Fig. C. There are also many variations to the fixture designs thus far illustrated; each, as previously stated, will depend on the size and shape of part, the finish desired and the part manufacturer's requirements.

Efficient, trouble-free handling of the fixture is accomplished by bolting it to the barrel door. By mounting it in this manner, instead of inside the barrel, the possibility of media chips being lodged in fixture tracks or bolt holes and thus "freezing" the fixture in place, is thereby eliminated. Also, by this arrangement, instead of positioning door and fixture separately, time and motion are saved during the loading and unloading operations. To utilize this equipment to its greatest efficiency, an overhead hoist along with a manual or electrical monorail is recommended for loading and unloading.

Most large or intricate parts are adaptable to standard one door fixture barrels. However, there are special instances when multiple fixture door equipment will increase finished output for certain types of parts. An example is the 4-door 40 in diameter barrel shown in Fig. D. In sample processing, it was determined that only nine of these washing machine agitators could be processed per loading in a one-door machine. But with a multiple fixture door unit, 16 could be processed at one time. Thus, the recommendation was made to the manufacturer and accepted to use the multiple fixture door unit in his finishing department. In fixturing the parts, four are mounted on holding bars attached to a neoprene lined plate on the door.

The agitators have a 20 minute burnishing cycle and thus four are completed every five minutes. By having extra fixture doors available, the manufacturer is able to maintain a semi-continuous production of these parts. The only time loss is the 45 second interval between loading and unloading door fixtures. One of the important advantages of multiple fixture door units is in such processes as burnishing which only require short time cycles; the loading and unloading of media is entirely eliminated as long as parts requiring the same media are being processed. Flushing the barrel, and recharging with new compound solutions and water is kept to a minimum because in many cases the solution can be reused several times. If in the future, other production parts require barrel finishing, the barrel can be converted for either "loose" or standard fixture finishing by removing the steel plates and inserting rubber plugs in the bolt holes.

Other models of the multiple fixture door barrels have been designed and built with as many as eight fixture doors. However, it must be emphasized that in most cases, a unit of this type will not have the production capacity of a standard one-door fixture type barrel. Only in special applications such as the one just described where size and shape of the part require the multiple fixture door unit, should they be recommended.

Special Diameter Fixture Barrels

While standard 30 in and 40 in diameter barrels are large enough to process most large metal parts, special units of larger diameter have been built. Fig. E shows a fixtured main bearing support for a jet engine that has a 37 in OD. A 58 in diameter barrel is required in processing this part in order to permit the proper media flow over the part's outer periphery.

To correctly process the triangular serrated track component of an automatic pin setting machine, shown fix-

tured in Fig. F, a 48 in diameter barrel is used. In mounting, these parts are first pre-assembled on fixture adapters. Then 29 assembled units are placed on the square holding shaft fixture. This design was necessary to prevent the parts from turning in the barrel while being processed. Parts of this type would be very difficult to properly finish by any other method and still maintain the absolute uniformity required.

Preliminary Hand Operations in Some Cases

There have been instances with some types of large parts in which manufacturers have found it advantageous to use fixture barrel processing in combination with preliminary hand operations. A typical case would be parts with heavy burrs; these are snagged or shaved by hand before being barrel finished in order to save production and machine time. Another example would be on parts where several different radii have to be formed. Such a part may have an area that requires less radius than another area of the part. The area requiring the least amount of radius is masked off so that while the part is being processed, no finishing action can be performed on the masked area. The part is processed for a predetermined time interval to allow the greater radius to be nearly formed. The barrel is then opened and the mask is removed from the area of less radius. The part is then processed to completion and the different radii are formed.

For example, on one type of jet engine rotor compressor disk there are sections with allowable radius specifications of 0.030 and other sections allowing only 0.0010. To process this part, the smaller radius is masked and the part is processed until the larger radius is reduced to 0.020–0.022. The mask is then removed and the processing cycle is completed. On the finished part, both sections are within the allowable range of tolerances.

At first appearance, the above procedure may seem time consuming and costly. However, because of the advanced design of fixtures and masking apparatus, the actual preparation time is minimized. And the work being done in the barrel that would normally be done by hand permit unusual cost savings and achieve absolutely uniform finishes.

To obtain the correct finish on fixtured parts, in most cases, the barrel cycle has to be intermittently reversed. The reversing assures an even media flow to all surfaces of the parts; otherwise some surface configurations would be shielded from the abrading action. The complete reversing cycles can be controlled by automatic pre-set timing mechanisms. The timer controls the time of beginning and end of the complete process cycle, the time required for rotation in either direction. It also provides a short time delay between reversing cycles so as not to overload the machine's motor.

Multi-compartment Barrels for Low Production

Where production of parts is low or where various finishes are required on different parts, the multi-compartment

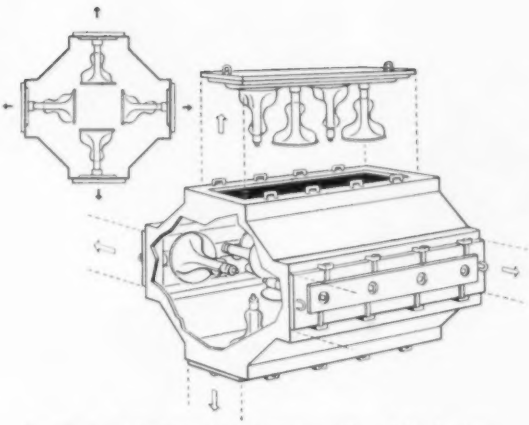


Fig. D. A 4-door multiple fixture-type barrel for finishing washing machine agitators. Sixteen parts are mounted with holding bars

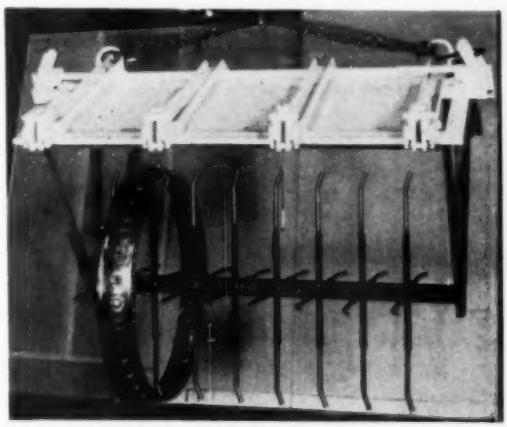
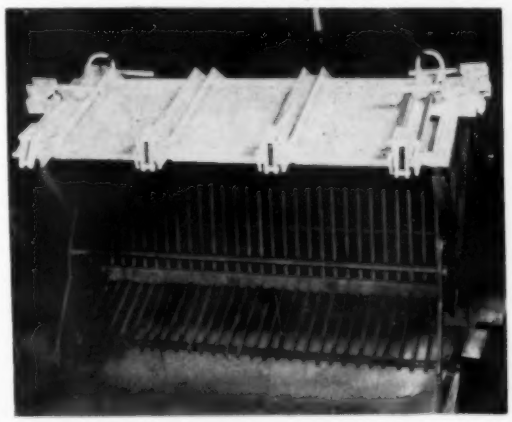
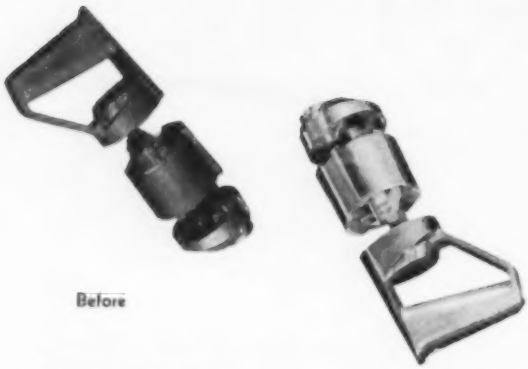


Fig. E. A 37OD main bearing support for jet aircraft engine. This part requires a special 58" diameter barrel in order to obtain proper finish

Fig. F. A square holding shaft fixture rack for barrel finishing triangular serrated tracks for automatic pin setting machines. Twenty-nine of these parts can be fixture processed in one loading

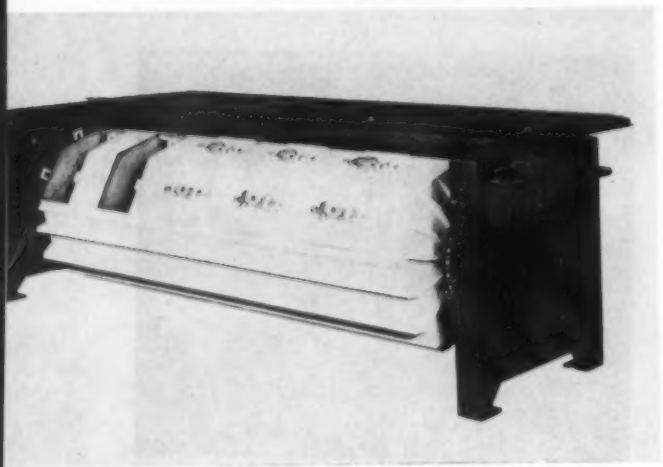




"Before" and "after" photos of electric drill gun housings finished by fixture barrel processing

barrel with individual doors has proved very satisfactory. The unit in Fig. G has five double-flat doors with individual compartments on each side of the barrel, or a total of 10 compartments. Each, if required, could be loaded with different media and finishing compounds to obtain various finishes on different parts or take the same part through various stages. Each compartment accommodates one or two large parts. Also, as in the case of multiple fixture door equipment, the multi-compartment barrel with individual doors saves time and expense of changing media, flushing compartments and recharging with new compounds as would be required by using standard fixture barrels for low production work. Again, it must be pointed out that the multi-compartment units have the same limitations in production capacity as the multiple fixture door units. Multi-compartment units that have one door across the flat of the barrel are also available. Units of this type are used where parts being processed require the same compounds and media. Since it is not possible to provide a perfect seal between compartments which would prevent leakage of solution, this type of unit cannot be used for finishing different parts simultaneously.

Fig. G. A multi-compartment barrel with individual doors. Double-flat doors provide ample room for loading and unloading large parts. This barrel has 10 individual compartments



How to Determine Fixture Finishing Requirements

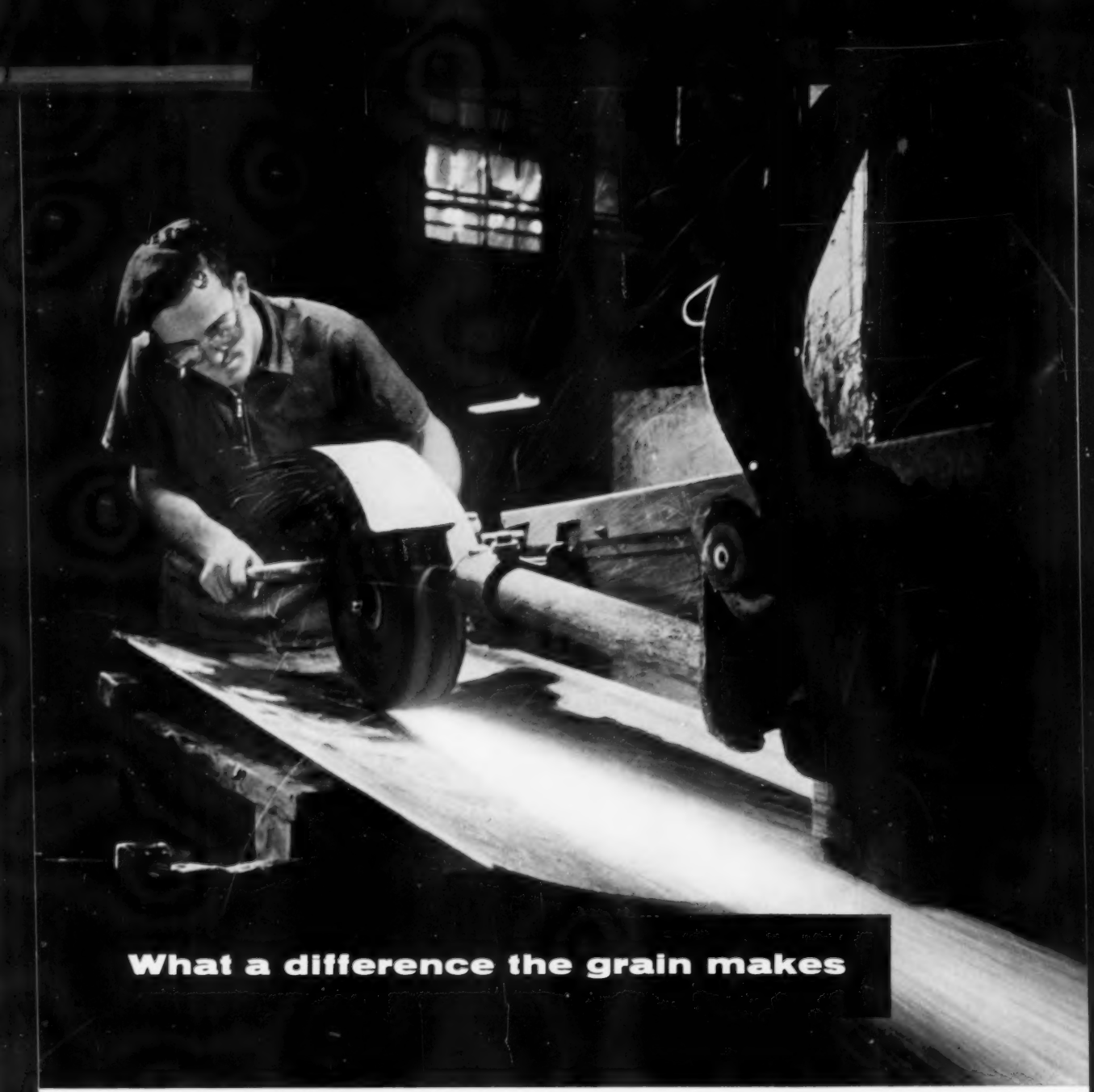
In order to determine whether various types of large or intricate parts can be finished in a fixture-type barrel, a sample part and specifications, along with proposed production, should be given to a qualified barrel finishing process engineer. He will study the part and then design and build a sample fixture for laboratory work on the part. After the part has been sample processed in the laboratory, it will be returned to the process engineer who then can prepare a complete process report for the manufacturer. This report will include: the fixture type equipment and finishing materials required to obtain the proper finish on production parts; the number of parts that can be processed per barrel run; the time cycles for processing the part and the estimated loading and unloading time. From this information, the manufacturer can determine cost per finished piece and compare it with cost of the methods presently being used.

GENE E. OLSON is chief engineer of the Almco Division of Queen Stove Works, Inc., of Albert Lea, Minn., a barrel finishing equipment and supplies manufacturer. He received his M.E. from Ohio State University. He was employed by the Curtis Wright Corp., Columbus, in the wing design section. Later, he became a design engineer at Nippert Electrical Products. He is now in charge of equipment and special barrel finishing systems design at Almco. Olson is also an ASAE member.

Olson

Mickelson

HAROLD MICKELSON is chief laboratory technician for Almco. In the past eight years, he has made some important contributions to the development of barrel finishing processes for metal parts of all types.



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PATENT ABSTRACTS

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Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co.
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,723,953, November 15, 1955—Electrolytic Plating Apparatus—P. Burgemeister and T. Healy, assignors to Crown Cork and Seal Co., Baltimore, Md.

A vertical type of steel strip plating apparatus is described.

5 claims, figure.

—AES—

No. 2,723,952, November 15, 1955—Method of Electrolytically Coating Magnesium and Electrolyte Therefore—H. A. Evangelides, Chalfont, Pa.—Granted under Title 35, U. S. Code (1952), sec. 266.

An electrolytic bath for forming a coating on the surface of magnesium and magnesium alloys containing 1–60 g/l of a manganate (Na or K), 1–300 g/l of a manganate (Na or K), 10–300 g/l of a phosphate (Na or K), 20–130 g/l of an alkali metal hydroxide (Na or K) and 1–125 g/l of an aluminum compound (hydroxide, or Na or K aluminates). Other claims give the current density as at least 5 asf and the temperature—10–65° C and describe a post treatment in an aqueous solution of hydrofluoric acid followed by heating at 85–105° C for 2–6 hours at a humidity of 95 per cent. Example A described a bath as containing:

Potassium manganate	20 g/l
Potassium fluoride	35 g/l
Trisodium phosphate ($12M_2O$)	35 g/l
Potassium hydroxide	100 g/l
Aluminum hydroxide	30 g/l

Unique corrosion and abrasion resistant properties are claimed. Either ac or dc current may be used, but ac appears better with the optimum frequencies being from 13 to 50 cycles per second. The preferred current densities and temperatures are 10–20 asf and 20–30° C, respectively.

21 claims.

—AES—

No. 2,723,928, November 15, 1955—Soldering Compositions for Aluminum—E. Fisher and H. Green, assignors to Horizons Inc., Princeton, N. J.

The soldering composition is characterized by having a melting point and the ability to remove aluminum oxide from the surface below 200° C. The product is a fused mixture of aluminum chloride, an alkali metal chloride (Na, K and Li), and a heavy metal chloride, the metal of which is electronegative to aluminum. See also 2,723,929 assigned to Horizons, Inc. (9 claims) and 2,723,930, (8 claims).

6 claims.

—AES—

No. 2,723,448, November 15, 1955—Brazing Process—M. Miller, assignor to Aluminum Company of America, Pittsburgh, Pa.

This method of brazing aluminous metal members consists of assembling said members in the arrangement desired with filler metal between, immersing in a salt bath which is activated by the introduction of anhydrous hydrogen chloride or fluoride. The bath is free of heavy metal halides and consists of 2–60 per cent of the chlorides of beryllium calcium, barium strontium and magnesium and 6.5–10 per cent of the fluorides of beryllium, magnesium and aluminum with the balance being an alkali metal chloride.

See also 2,733,449 by same inventor (6 claims).

11 claims.

—AES—

No. 2,723,204, November 8, 1955—Dry Plating with Metal—R. Pottberg and E. Clayton, assignors to Peen Plate, Inc., Baltimore, Md.

A method for cladding metals such as steel with softer metals such as zinc is claimed. This is done by bringing the larger part into contact with the metal powder under pressure as can be done in a ball mill or tumbling barrel. The steel shot pounding upon the steel object through the metal (e.g., Zn) causes a build-up of the metal powder as a cladding on the object.

8 claims.

—AES—

No. 2,722,784, November 8, 1955—Buffing Head—Otto Thiel, assignor to Midwest Supply & Mfg. Co., Ferndale, Mich.

A buffing head having a rotatively driven buffing element, a pivot extending from the head at right angles to the rotational axis of the buffing element.

11 claims.

—AES—

No. 2,721,562, October 25, 1955—Pickling and Pickling Agent Regeneration Apparatus—R. Irvine, assignor to Belle Fons Chemical Corp., Pittsburgh, Pa.

A pickling apparatus is described consisting of a pickling section, a mixing section and a rinsing section. Pickle acid (sulfuric) is constantly removed from the first section, water evaporated and oleum added to throw down ferrous sulfate which is filtered out and recovered. The concentrated acid is fed back into the mixing section which is lower than the final rinse so dilution is effected and the diluted acid in turn overflows into the pickling section. The steel strip by-passes the mixing section, going from the pickle tank to the rinse.

3 claims, 1 figure.

—AES—

No. 2,726,979, Dec. 13, 1955—Deoxidizing Copper Base Metal Parts—J. Toth, assignor to Ford Motor Company, Dearborn, Mich.

The process consists of alkaline cleaning, deoxidizing with a mixture of sulfuric and nitric acids, followed by treating the surface with a solution of ½ to 16 oz/gal of a mixture of sodium thiosulfate (65–85 per cent), sodium tetraborate (12–24 per cent), and an alkyl aryl sulfonate (5–10 per cent).

2 claims.

—AES—

No. 2,726,968, Dec. 13, 1955—Electroless Nickel Solution Control—R. Spaulding, assignor to General Motors Corporation, Detroit, Mich.

The improvement to the chemical reduction method of depositing nickel consists of replenishing the hypophosphite by adding hypophosphorous acid and treating said bath with an anion exchange material to remove phosphite ions produced during the operation of the process.

12 claims.

See also 2,726,969 by same inventor.—9 claims.

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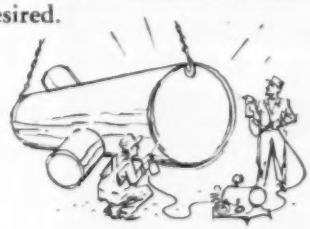

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ARTICLE REFERENCES

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WILLIAM TUCKER
Eastman Kodak
Rochester, N.Y.

Most of the articles listed here may be obtained by writing to the Publication. Addresses are included for the reader's convenience.

27. ALLOYS

a. *FORMATION OF ELECTRODEPOSITS OF ALLOYS. IX. SILVER-THALLIUM ALLOYS.* (*German*)
Ernst Raub and Fritz Sautter
Metalloberfläche, Ausgabe B, V. 9, No. 10, October 1955, p. 145–147.
Potential measurements in silver baths with and without thallium salts. Relation between thallium content of deposits and current density. Hardness and structure of deposits. Graphs. 5ref. (L17, Ag,Tl).

b. *TIN-ZINC ALLOY PLATING; ITS APPLICATIONS TO COPPER WIRE*
Frederick A. Lowenheim and Robert T. Gore
Wire and Wire Products, V. 30, October 1955, p. 1219–1221, 1295–1297

c. *A STUDY OF ALLOY PLATING. I. ELECTROPLATING OF COPPER-TIN ALLOYS*
Tadayoshi Inui and Shigeki Matsuo (Nippon Kinzoku Gakkai-Si, 1953, 17, (4), 191–194) (In Japanese)
The Journal of the Institute of Metals, Vol. 84, December 1955, p. 329

28. BARREL FINISHING

a. *INVESTIGATION OF BARREL FINISHING AS A MEANS OF EFFICIENT BURR REMOVAL*
Charles E. Kincaid
General Motors Engineering Journal, Vol. 3, January-February 1956, No. 1, p. 34–39

29. CHROMIUM

a. *CHROMIUM IMPREGNATION FOR CORROSION RESISTANCE AND HEAT PROTECTION*
Electrical Manufacturing, Vol. 56, November 1955, p. 150–152
Superior properties and lower costs make surface diffusion of chromium compete in many applications, with stainless steel, chromium or nickel plating. Micrograph, photographs. (L15, Cr)

b. *CHROMIUM PLATING ROCKET MOTORS AT RYAN*
Bernard W. Floersch
Steel Processing, Vol. 41, October 1955, p. 657–658

30. CLEANING

a. *EVALUATION OF METAL CLEANERS AND CLEANING METHODS*
J. C. Harris, W. Stericker and S. Spring
Electroplating and Metal Finishing, Vol. 8, No. 12, December 1955, p. 423–425

31. CORROSION

a. *MATHEMATICAL STUDIES ON GALVANIC CORROSION. IV. INFLUENCE OF ELECTROLYTE THICKNESS ON THE POTENTIAL AND CURRENT DISTRIBUTIONS OVER COPLANAR ELECTRODES USING POLARIZATION PARAMETERS*
James T. Waber and Bertha Fagan
Journal of the Electrochemical Society, Vol. 103, No. 1, January 1956, p. 64–72

b. *CORROSION BEHAVIOUR OF MULTILAYER (ELECTRODEPOSITED) METALLIC COATINGS*
V. V. Romanov
(Zhur. Priklad. Khim., 1955, 28, (5), 475–479) (In Russian)
The Journal of the Institute of Metals, Vol. 84, December 1955, p. 320

c. *CORROSION OF METALS IN THE TROPICS*
H. R. Ambler and A. A. J. Bain
Journal of Applied Chemistry, Vol. 5, September 1955, p. 437–467

d. *CORROSION*
Mars G. Fontana
Industrial and Engineering Chemistry, Vol. 47, November 1955, p. 81A–82A, 84A

32. DIE CASTINGS

a. *HEAT TREATMENT IMPROVES PLATING ON ZINC DIE CASTINGS*
W. G. Stephenson, Jr.
Products Finishing, January 1956, p. 28–34

33. ELECTROFORMING

a. *MOLD MAKING BY ELECTROFORMING*
S. Fialkoff
Plastics Technology, Vol. 1, October 1955, p. 542–544, 559
Intricate molds are reproducible and have interior finishes that do not require further polishing. Photographs, diagram (L18).

34. ELECTROLESS NICKEL

a. *ELECTROLESS NICKEL PLATING AND ITS APPLICATIONS*
Dr. Bosdorf
Electroplating and Metal Finishing, Vol. 8, No. 12, December 1955, p. 415–417

35. ETCHING

a. *MICROMACHINING WITH VIRTUAL ELECTRODES*
A. Uhlir, Jr.
Review of Scientific Instruments, Vol. 26, October 1955, p. 965–968
Minute holes were drilled in germanium, molybdenum, iron, copper, silver and tungsten carbide by electrolytic etching. The flow of current is localized by a nonconducting partition in the electrolyte. Graph, diagrams. (G17, Ge, Mo, Fe, Cu, Ag, W).

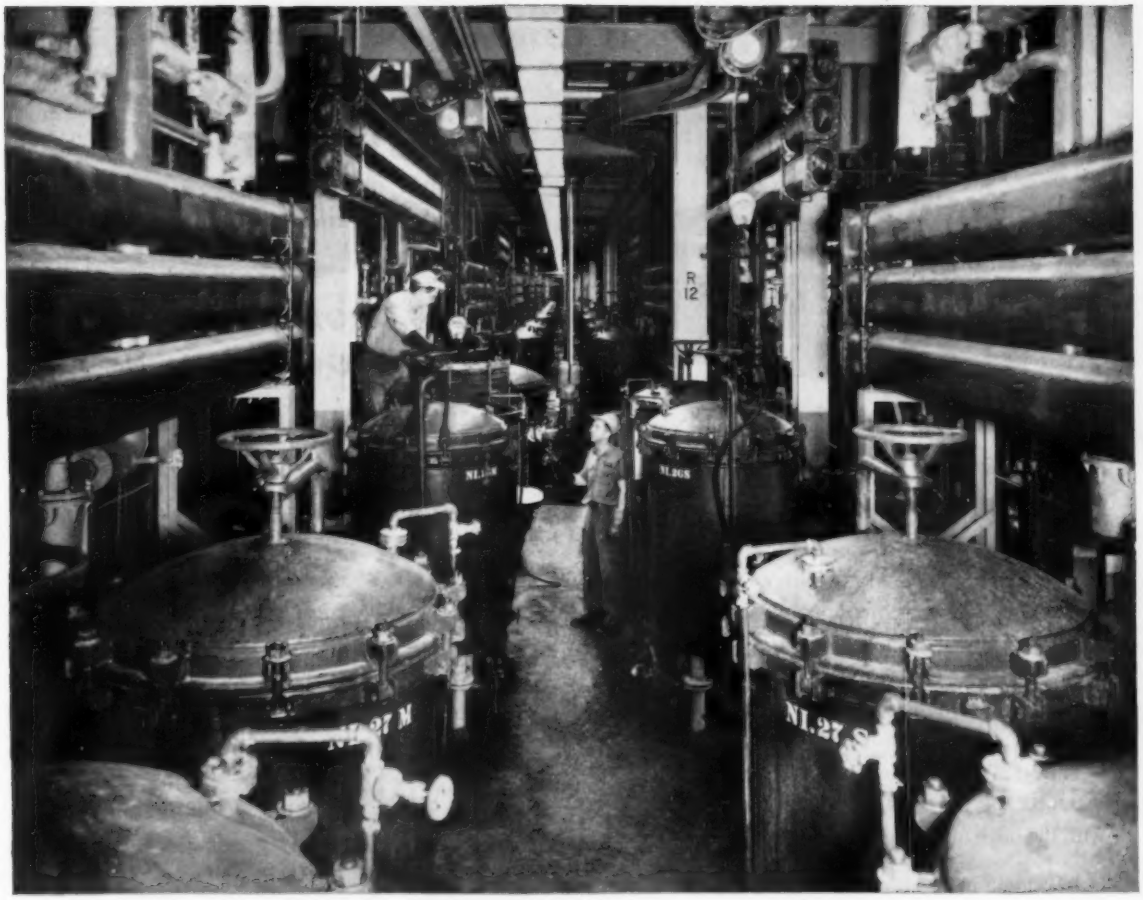
36. LEVELING

a. *LEVELING POWER OF ELECTROPLATING BATHS*
Henry Brutcher Translation No. 3587, 13 p.
(From Metallic Bulletin, Holland), V. 3, No. 10, 1954, p. 233–242, No. 11, p. 261–263
Henry Brutcher, Altadena, Calif.

37. ORGANIC

a. *DUAL SPRAY APPROACH CAN TAILOR YOUR COATING LINE*
Martin Abel
The Iron Age, January 19, 1956, Vol. 177, No. 3, p. 80–82

(*Continued on page 373*)



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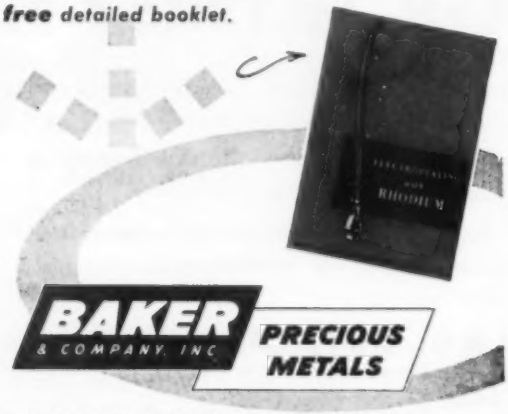

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2:00 P.M.—Welcome Address by Dr. Allan A. Janis, president, Buffalo branch.

2:10 P.M.—Polishing and Buffing Compounds and Polishing Wheels, by Howard J. McAleer, Formax Mfg. Co.

3:00 P.M.—Interesting Applications of Chrome Plating, by Edward C. Bertucio—Mutual Chemical Co.

4:00 P.M.—Forecast of Future Development in Electroplating, by Dr. Louis Weisberg—Consultant N. Y. C.

Entertainment Program—Women's Program Co-Chairmen Mrs. J. L. Martin and Mrs. Wm. D. Hart.

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ARTICLE REFERENCES *(Continued)*

38. STRESS

a. *STRESS IN ELECTRODEPOSITS*
R. A. F. Hammond
Institute of Metal Finishing, Transactions, Vol. 30, 1954, p. 140–157

39. STRIPPING

a. *HOW TO STRIP PLATED DIE CASTINGS*
W. K. Murray.
Precision Metal Molding, Vol. 13, October 1955, p. 67–68, 82

40. STRUCTURE

a. *THE STRUCTURE OF ELECTRODEPOSITED METALS*
Rolf Weil and Harold J. Read
Metal Finishing, Vol. 54, No. 1, January 1956, p. 56–59

41. TESTING

a. *PRACTICAL THROWING POWER*
J. B. Mohler
Metal Finishing, Vol. 54, January 1956, p. 53–55

b. *AN X-RAY TIN THICKNESS GAGE FOR THE ELECTROLYTIC TIN LINE*
R. R. Webster.
Iron and Steel Engineer, Vol. 32, November 1955, p. 65–71; disc. p. 71–72

42. TECHNICAL REVIEW

a. *TECHNICAL DEVELOPMENTS OF 1955*
Nathaniel Hall.
Metal Finishing, Vol. 54, No. 1, January 1956, p. 43–52

43. WATER

a. *NOTES ON THE USE OF WATER FOR CLEANING AND ELECTROPLATING*
Edward Engel.
Products Finishing, January 1956, p. 38–50

(Addresses for all publications will be listed in April issue.)

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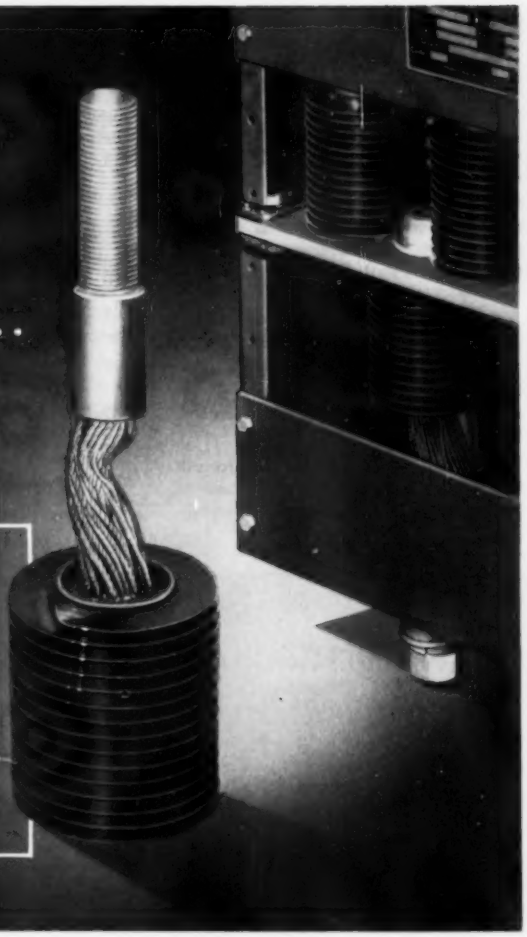

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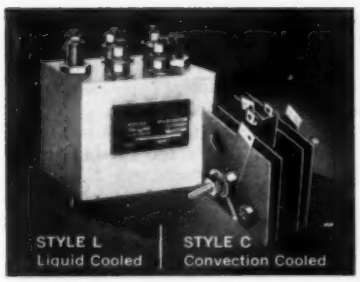

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Precision Electrical Measurements—A Symposium edited by P. Dunsheath (Philosophical Library) $12.00, AES members, $10.20.

This publication contains the proceedings of the London Symposium held at National Physical Laboratory in November 1954. Twenty-six papers devoted to capacitance and dielectrics, inductance and magnetics, electrotechnics, high voltage measurements and high voltage impulse testing techniques were presented. Complete with discussions, illustrations and diagrams.

Electricity and Magnetism by J. Newton (Philosophical Library) $10.00, AES members, $8.50.

A Detailed study of the phenomena and theory of electricity and magnetism.

Design of Piping Systems by members of engineering department of The M. K. Kellogg Co. (John Wiley and Sons) 365 pages; $15.00; AES members, $12.75.

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Profit Management and Control by Fred V. Gardner (McGraw-Hill) 285 pages; $6.00; AES members, $5.10.

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Modern Physics: A Textbook for Engineers by Robert L. Sproull (John Wiley and Sons) 491 pages; $7.75; AES members, $6.60.

This new book sets down those aspects of twentieth century physics that are of greatest engineering interest.

Chapter headings in "Modern Physics" include: fundamental particles, assemblies of particles, atoms and nuclei, wave-particle experiments, introductory quantum mechanics, atomic structure and spectra, molecules, binding and energy bands in solids, electrical thermal and magnetic properties of solids, imperfections in solids, semiconductors, physical electronics, and applied nuclear physics. Each of these chapters is preceded by a succinct introduction which leads to the heart of the material. The book is further characterized by its use of mks units throughout.

Automatic Process Control for Chemical Engineers by N. H. Ceaglske (John Wiley & Sons) 228 pages; $6.75; AES Members $5.75.

The new book offers a basic and systematic approach to the analysis and design of chemical engineering unit operations, linking the application of servomechanism principles directly to chemical process control.

Professor Ceaglske is in the department of chemical engineering at the University of Minnesota. He was previously at other leading teaching centers, and has engaged in research for several well-known industrial concerns.

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The Cover

DEAR SIR:

Congratulations on the beautifully colorful February cover and especially the way you managed to bring out all those finishes for aluminum.

H. Tsavlis
Wehrheim Machinery Co.

[Credit for the excellence of the aluminum finishes on that cut must go to Horan Engraving Co. of Newark, N. J. They accomplished a remarkable job as described in the "Cover Story" of the February issue.]—Ed.

Nickel Story

DEAR SIRS:

May I congratulate you on the excellent treatment given the nickel shortage story in the January issue of PLATING. I don't think I have ever seen a story of this kind handled any better.

We have secured a few additional clippings from magazines since your story appeared, and I have sent them along to Glenn Friedt. Also, when the 7-week Detroit newspaper strike ended, the Detroit papers did a rehash of important news events which occurred during the strike. The nickel story was given treatment which confirmed the statement of newsmen at our press conference that it would have been a page 1 story in Detroit had the newspapers not been on strike at that time.

Sincerely,
James P. Chapman
Public Relations
Detroit, Mich.

Nomenclature

DEAR SIRS:

One of the criteria of a science, as distinguished from art, is a standard nomenclature, which ensures that words have definite and unambiguous meanings. Electroplating is in a period of transition from art to science, and the process can be hastened by early adoption of standard terminologies. The publications of the AES can make their contribution by strict enforcement of editorial standards in this respect, and I should like to mention two cases which in my opinion are ready for standardization.

1. Base metal vs. basis metal. I think it is generally agreed that these terms should be distinguished: base metal means opposite of noble metal; basis metal is the metal to which something is applied, such as an electroplate, organic coating, etc. In spite of the general agreement, too many authors are careless in their use of the terms. PLATING could take the lead in enforcing a needed standardization.

.2 Plating of vs. plating on. Twenty years ago an article entitled "Plating of aluminum" would almost certainly have been one dealing with techniques for plating **on** the basis metal aluminum. Today one couldn't be sure: so many unusual metals are being dealt with, both as bases for plating and as deposits, that it seems to me to be worth while to have unambiguous terms. Papers concerned with electrodeposition **of** aluminum would then be distinguished from those about plating **on** aluminum, and the time of the literature searcher would be conserved: he would know immediately whether a given paper was of interest to him or not.

A good example of confusion occurs in the latest issue of the AES Proceedings. On page 44 there appears an article titled "Plating of Beryllium Copper" and on page 232 the discussion on this paper is headed "Electroplating on Beryllium Copper." In my opinion the second title is correct, the first one misleading. In this particular case, not too many readers are likely to be confused, but the principle is obvious. The publications of the AES can make a real contribution by promoting worth-while nomenclatural standardizations.

Yours very truly,

Metal & Thermit Corporation

F. A. Lowenheim
Supervisor Electrochemical Research

. . . thanks to M&T copper-tin BRONZE

AS AN UNDERCOAT FOR CHROMIUM, M & T copper-tin Bronze plating is helping nickel-short platers to solve some of their most critical production problems.

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WE GOOFED

DEAR SIRS:

The big $64,000 question—"Is it is or is it ain't?"

In the January issue of PLATING, particularly your "cover story" on page 48 and Mr. Redmond's article, page 78, 4th paragraph, the 45° angle cut for a 10 to 1 magnification of the surface is mentioned. My trigonometry figures only a 1.4 magnification for a 45° cut and 5° angle (approximately) necessary for the 10 to 1 magnification.

We have followed the paper given at the 1953, 40th annual convention of the AES by Westman and Mohrnheim, "A Metallographic Study of Some Steels Used for Nickel Plating." This paper is printed in the 40th Annual Proceedings, page 138, and the "Taper Sectioning" paragraph on page 140, second column, bottom, states that "approximately a 5° angle is necessary for the 10–1 vertical magnification." Also, see Fig. 7 at top of page 141.

Very truly yours,
Studebaker Division
Studebaker-Packard Corporation
Ralph D. Wysong
Assistant Manager
Manufacturing Research Dept.

DEAR SIRS:

My compliments to the excellent cover story on Scratch Pattern (Plating 43, 48, 1956). Unfortunately, either a printing error or some oversight is repeated which appears in the article, "Pre Finish or Flat Polishing" by R. W. Redmond, same issue pg. 78. The 45 degree angle should really be 5 degree 44 min. since the magnification obtained is determined by the cosecant of the tapering angle (rf. Westman, Mohrnheim, Plating 41, 1372, 1953). A taper angle of 45 degrees would result in a magnification of only 1.41 times.

It is unfortunate that this error occurred since in every other respect I am sure the article served a very useful and informative purpose. The principle involved is one which should find increased favor by many metallographers.

Sincerely yours,
A. F. Mohrnheim
Metallurgist

[We looked up that "45 deg." statement—even to rereading Westman and Mohrnheim's 1953 article—and then allowed the error to stand on the page proofs!—Ed.]

THE BOM

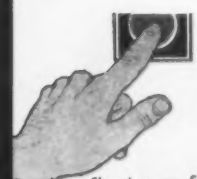
DEAR SIRS:

The AES Branch Officers' Manual—Motion Picture Directory—mailed January 9, 1956 has been received.

I can't tell you how much the many hours of labor spent on compiling this directory is appreciated We feel it will be most helpful in planning our meetings and making them interesting to everyone.

Thank you, Dr. Heiman.

Sincerely,
Fred J. Kaim
President
Twin Cities Branch, AES



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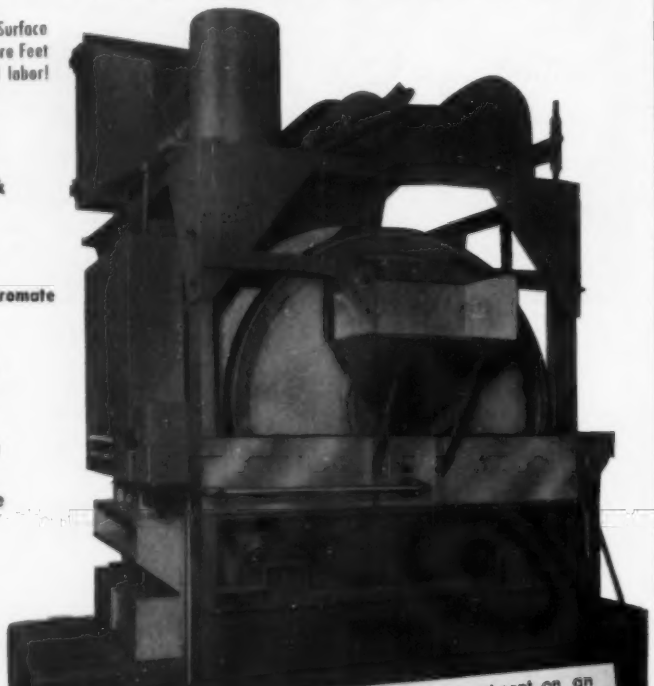

1. Cold water soak
2. Lead
3. Cold line rinse
4. Drain
5. Recirculated Chromate bright rinse
6. Drain
7. Cold line rinse
8. Drain
9. Recirculated Alkaline bleach
10. Drain
11. Hot water rinse
12. Drain
13. Hot air dry
14. Unload

Put your metal cleaning or surface treatment on an automatic basis. With this RANSOMATIC Drum Type Machine pushing a button starts the cycle of 14 operations. The RANSOMATIC takes over from loading (8 cubic feet per batch) to automatic unloading 15 minutes later.

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If you are going to move, it is necessary that the proper notification be made, at the earliest possible moment, so that you may continue to receive your copies of PLATING without interruption.

Such notification should be made to headquarters by letter, post card, or post-office form No. 22S, giving the old address as well as the new, with postal-zone number if any. You should also notify your local post office on postal form No. 22 of your change of address. Both postal forms are obtainable at any post office.

As considerable time is required to process a change of address, you are urged to advise the PLATING Circulation Department as soon as you know your new address, preferably three weeks in advance of moving.

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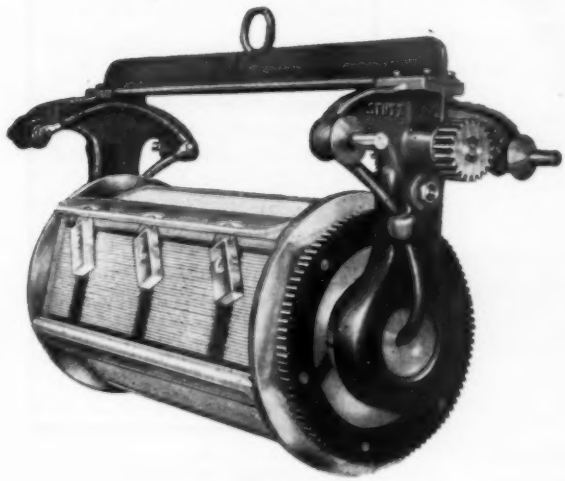

Stutz Plating Barrel Unit for continuous operation through Alkali Cleaning, Acid Pickling, Acid and Alkaline Plating solutions and rinsing. Largest number of cylinder perforations possible.

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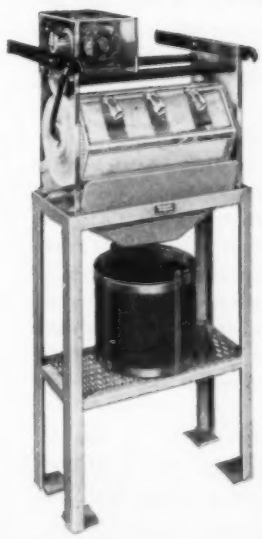

Made in 2 standard sizes. Also smaller and with partitions.

Standard openings	3/32″
6″ x 12″, I.D.	$176.50
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On inquiry specify whether production or portable barrels are desired.

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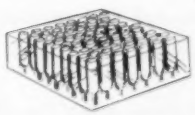

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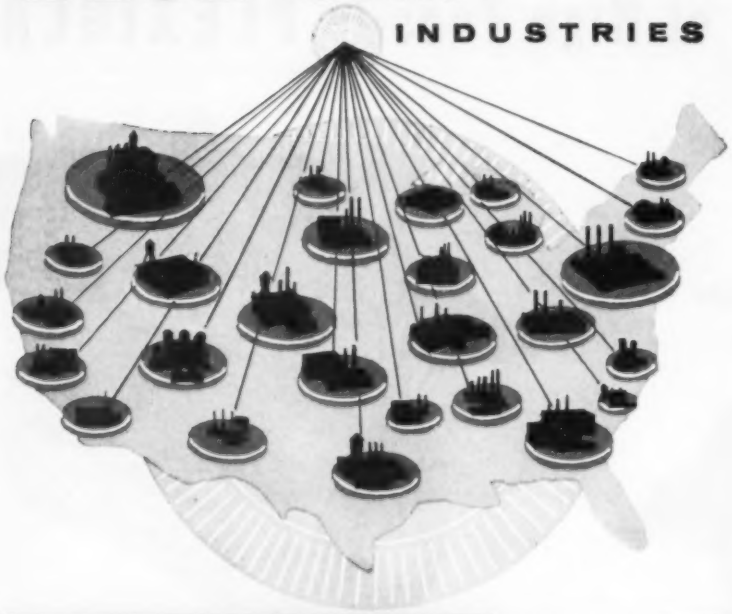

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R. M. WICK

Dr. Richard M. Wick, assistant head of the Bethlehem Steel Company research department, died on February 18 in Baltimore, Maryland as a result of injuries sustained in a fall in the lobby of the Lord Baltimore hotel.

Wick, AES Research Committee chairman in the late 1940's, was presently serving as Society liaison representative to the Intersociety Corrosion Committee of the United Engineering Foundation.

He was one of the nation's foremost experts in the field of electroplating and metal finishing. He was a member of the Allentown-Reading branch of the AES. A resident of Allentown, Pennsylvania, Wick was married and had two sons.

JAMES McELGIN

James McElgin, manager of the Metal-Working Department of E. F. Houghton & Co., Philadelphia, died suddenly while on business in Chicago on December 7.

McElgin, who was 54, had been employed by Houghton since 1924. He was a Chemical Engineering graduate of Brooklyn Polytechnic Institute and took graduate work at Temple University in Metallurgical Engineering.

He was a 25-year member of the American Society for Metals, and served on a War Production Board Committee on Heat Treatment of High Speed Steels. He also held membership in the American Ordnance Association and American Foundrymen's Society. In recent years he made numerous talks before chapters of the ASM and the American Society of Tool Engineers.

McElgin is survived by his wife, his parents, Mr. and Mrs. John F. McElgin of Cheltenham and a brother, John W. of Abington, Pa.

INTERSOCIETY NEWS

ASTM Committee Week To Be Held In Buffalo

The American Society for Testing Materials is holding its 1956 Committee Week and Spring Meeting at the Hotel Statler, Buffalo, N. Y., February 27 to March 2, 1956. More than 250 ASTM technical committees and their subcommittees are expected to meet during the week to discuss and review the work they have done during the year in preparation for the completion of their year's work to be reported at the Annual Meeting in June.

The only non-technical event of the week will be the dinner and entertainment on Wednesday evening, February 29, planned and sponsored by the Buffalo District Council.

At an all-day technical session, Wednesday, sponsored by Committee B-8 on Electrodeposited Metallic Coatings, there will be presented a Symposium on the Properties, Tests and Performance of Electrodeposited Metallic Coatings. Eight papers written by outstanding authorities in their respective fields will be presented.

The subject of the Symposium is considered so important that it will be repeated during the Second Pacific Area National Meeting at Los Angeles, September 17 to 21, 1956. Titles and authors of the Symposium papers are:

"Introduction" by Symposium Chairman, W. L. Pinner, Houdaille-Hershey Corp., Highland Park, Mich.

"History of ASTM Committee B-8," William Blum, formerly Director of Chemistry Section, National Bureau of Standards.

"Corrosion Behavior and Protective Value of Decorative Copper-Nickel-Chromium and Nickel-Chromium Coatings on Steel," C. H. Sample, International Nickel Co.

"Evaluation of Methods Available for Measurement of Surface Luster in Plated Coatings," Glade Bowman, Standard Steel Spring Div., Rockwell Spring and Axle Co.

"Metal Cleaning Prior to Electroplating," S. Spring, Pennsylvania Salt Manufacturing Co.

"Comparison of the Corrosion Behavior and Protective Value of Electrodeposited Zinc and Cadmium Coatings on Steel," C. H. Sample and R. B. Teel, International Nickel Co.; and A. Mendizza, Bell Telephone Laboratories.

"Evaluation of Supplementary Conversion Coatings on Zinc and Cadmium," R. E. Harr, Western Electric Co.

"Atmospheric Exposure of Electroplated Lead Coatings on Steel," A. H. DuRose, Harshaw Chemical Co.

"The Standard Salt-Spray Test—Is It a Valid Acceptance Test?" A. Mendizza, Bell Telephone Laboratories.

The Symposium will be scheduled for publication after it has been presented at Los Angeles and will be available from ASTM headquarters, 1916 Race St., Philadelphia 3, Pa., in the late fall of 1956.

ASTM COMMITTEE B-8 ON ELECTRODEPOSITED METALLIC COATINGS

SCHEDULE OF MEETINGS

TUESDAY—February 28, 1956

9:00 A.M. Advisory Committee

1:30 P.M. Subcommittee II on Performance Tests—W. L. Pinner, chairman

3:00 P.M. Subcommittee III on Conformance Tests—R. F. Ledford, chairman

WEDNESDAY—February 29, 1956

COMMITTEE B-8 SYMPOSIUM

THURSDAY—March 1, 1956

9:00 A.M. Subcommittee IV on Electroplating Practice—M. Frager, chairman

10:30 A.M. Subcommittee V on Supplementary Treatments for Metallic Coatings—M. Darrin, chairman

1:30 P.M. Subcommittee I on Specifications, Papers and Definitions—F. Ogburn, chairman

3:00 P.M. Committee B-8 (Main Committee)

BOOK FOR ASTE EXPOSITION AVAILABLE

A 16 page "Executive Plan Book" giving details of the 1956 ASTE Tool Show, annual technical conference program and plant tours scheduled for Chicago, March 19–23, is available to top management executives. The Plan Book is designed to aid industrial executives in assigning key men within their companies to cover specific exhibits, technical sessions and plant tours at the huge event.

Also included is convenient travel information, as well as hotel information and a room reservation blank.

A copy of the book may be obtained by writing on company letterhead to the American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38, Mich.

ASTM NAMES TWO SENIOR ASSISTANT TECHNICAL SECRETARIES

J. W. Caum and L. C. Gilbert have been designated Senior Assistant Technical Secretaries by the American Society for Testing Materials. Both Caum and Gilbert have been members of the ASTM Staff since 1946 and have been responsible for Staff contacts with numerous technical committees.

Caum, a metallurgist and a graduate of Pennsylvania State University, has been working with committees in the field of ferrous and non-ferrous metals. Gilbert, a civil engineer and a graduate of the University of Cincinnati, has been concerned with the work of committees on ceramics, cement and concrete, and other highway and building construction materials.

The appointments recognize and are in keeping with the very important work each has been carrying on for the Society.

ACHEMA ACTIVELY PLANS FOR EXHIBITIONS AND CONGRESSES

The ACHEMA 1958, 12th Chemical Apparatus and Equipment Congress and Exhibition, will be held in Frankfurt am Main during the period 31 May—8 June, 1958. These dates have been fixed by the Board of Management of the DECHEMA, Deutsche Gesellschaft für chemisches Apparatewesen, Frankfurt am Main, which has been responsible for all arrangements in connection with the ACHEMA Congress since 1920.

The ACHEMA 1958 will once again be held on the Exhibition Grounds of the City of Frankfurt am Main, where all ACHEMA Congresses and Exhibitions have been held since 1937. The steadily increasing importance of the ACHEMA Congresses and Exhibitions is very closely linked with the constant increase in the importance of Chemical Engineering. The large number of applications for space at the ACHEMA 1958 already received indicate that the existing Exhibition Halls, which have a total floor space of over 50,000 sq. metres, are no longer sufficient for this purpose. The city of Frankfurt has, therefore, decided to build another Exhibition Hall with 8,000 sq. metres of floor space. The provision of lecture rooms, cinemas and new restaurants is also envisaged. Another European Convention for Chemical Engineering will again be held in connection with the ACHEMA. A number of congresses will be held in connection therewith.

The European Federation for Chemical Engineering intends to hold its Second European Chemical Engineering Congress in connection with the aforementioned European Convention. This latter Congress will, in all probability, be held in Brussels.

INTERSOCIETY NEWS

MEPA TO HOLD ANNUAL AFFAIR AT WALDORF-ASTORIA

The 38th Annual Banquet and Entertainment of the Masters' Electroplating Association, Inc. of New York will be held on Saturday, May 12, 1956. The reception will be held in the SERT room at 6:30 P.M. and the Banquet and Entertainment at 8:30 P.M. in the Starlight Roof of the Waldorf-Astoria Hotel, New York City.

The Masters' Electroplaters Association is one of the largest local Associations of Job-Platers in the U.S. and is affiliated with the National Association of Metal Finishers. In the Metropolitan area, the member-shops of the Masters' do almost 75 per cent of all the contract finishing and they service some 5,000 metal fabricating firms. The officers are Sal Novelli of Service Plating Co., Chairman; Jesse Goldman of Grand Chromium Corp., Vice Chairman; and Frank Kaiser of Long Island Mechanical Plating Co., Treasurer. Goldman is also Banquet Chairman and S. C. Taormina is the Executive Secretary.

A banquet journal will also be published in connection with the event. Banquet Tickets may be obtained from the Association Headquarters at 59 East 4th Street, New York City.

AMERICAN WELDING SOCIETY'S SPRING MEETING

The most elaborate sessions ever staged on new developments in the field of welding engineering will highlight the American Welding Society's annual Spring meeting at the Hotel Statler, Buffalo, N. Y., during the week of May 7.

The meeting will be held jointly with the fourth Welding Show at Memorial Auditorium there. The show, too, will break previous records for the number of exhibiting companies and the size of the displays.

One hundred and eleven engineers will contribute 65 papers to be read at 21 sessions.

Five of the sessions will be co-sponsored by other organizations in the metals field. The welding committee of the Atomic Energy Commission will co-sponsor a session on nuclear reactor components, and the metals engineering division of the American Society of Mechanical Engineers will co-sponsor sessions on welding of dissimilar materials, welding of stainless steel, tests of welds, and designing for higher working stresses in pressure vessels.

Another feature will be a session devoted to safety, health and fire prevention by the society's technical activities committee.

Advance registration cards and hotel information may be obtained by writing the American Welding Society, 33 West 39th St., New York 18, N. Y.

PLASTIC DISPERSION ASSOCIATION FORMED

On January 9, 1956, representatives of sixteen plastisol manufacturers met in New York City to form a new association which will discuss, among other things, industry wide standards. The name tentatively selected for the organization is the Plastic Dispersion Association.

TENTH ANNUAL CONVENTION OF ASQC TO BE HELD IN MONTREAL

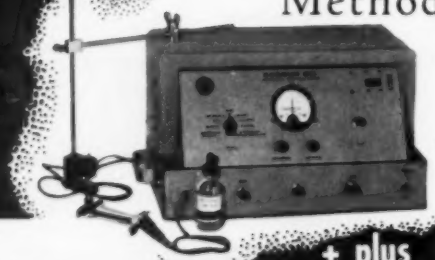
More than eighty speakers from the United States, Europe and Canada will be addressing the 10th Annual Convention of the American Society for Quality Control, to be held in Montreal on June 6, 7 and 8, 1956. Montreal's Palais du Commerce, which offers complete convention facilities under one roof, will be headquarters for the convention. Over 2,000 delegates from the United States and Canada are expected to attend.

This is the first convention of the Society to be held outside the United States. Present plans include some forty to fifty exhibits, showing recent developments in gages, calculators and other devices. Many exhibits will show applications and new techniques.

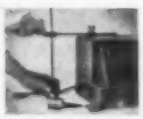
Plant tours through leading Montreal industries have been arranged to provide examples of Canadian applications of statistical quality control techniques. Copies of all talks given during the convention will be available in bound volumes. A book booth will exhibit the most up-to-date books available on quality control and industrial statistics.

Check plating thickness
WITH THE
KOCOUR ELECTRONIC THICKNESS TESTER*

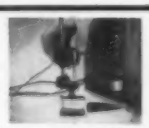
*Anodic Solution Method



6 Simple steps . . . to quick, accurate results


1. MOUNT THE CELL . . . on the spot to be tested and clip lead wire to specimen.

2. ADD TEST SOLUTION . . . which corresponds to the type of plating and base metal tested.


3. PLACE STIRRER IN POSITION.

4. SET SELECTOR SWITCH to the type of plating to be tested as indicated on panel.

5. PRESS THE TEST BUTTON to start the test . . . and upon completion the unit shuts off automatically.

6. TAKE THE READING directly from the counter on panel i.e. 0.0004".

TOTAL TIME . . . less than 2 minutes

+ plus these features

- DETERMINE THICKNESS OF decorative chromium, heavy chromium, silver, copper, tin, brass, cadmium, nickel, zinc, lead, lead-tin alloy, tin zinc alloy on various base metals and materials.
- WIDE THICKNESS RANGE
- DIRECT READINGS
- 90-95% ACCURACY
- TESTS ARE RAPID
- VIRTUALLY AUTOMATIC
- ELIMINATES HUMAN ELEMENT

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When you buy Koppers 35-40% KCN solution, you pay only for the active ingredient—Potassium Cyanide. Compare this with the following competitive materials on an "as is" basis:

Competitor A	97.6%
Competitor B	98.0%
Competitor C	98.5%
KOPPERS	*100%*

CASH SAVINGS *because you get more KCN per pound, when you buy Koppers!*

2. PURITY

It is an established fact that sulfur compounds are the critical impurities in Cyanide plating. Unlike certain solid types, Koppers liquid KCN is free of these impurities that cause dull surfaces.

Compare the following samples picked up at random with Koppers KCN solution:

Competitor A	210 parts per million
Competitor B	50 parts per million
Competitor C	103 parts per million
KOPPERS	*Less than 1 part per million*

Koppers KCN solution is extracted as hydrogen cyanide from coke oven gas from which all sulfur impurities have already been removed.

CASH SAVINGS *because you have fewer rejected parts, when you buy Koppers!*

3. EASE OF HANDLING

In bulk—users of large quantities of Koppers KCN solution find actual handling is at a minimum, compared to the handling of the solid material. Storage tanks and piping installations costs have been paid off in a short time with the money saved in handling. You don't have to protect it against freezing; no crystallization down to 0° F.

In drums—with a minimum of equipment—single dolly and rack—handling problems are solved. Then too, of course, there's no labor involved in dissolving Koppers KCN solution.

CASH SAVINGS *because you spend less for handling, when you buy Koppers!*

4. SAFETY

No dangerous cyanide granules to handle . . . no need to expose workers to toxic cyanide dust, when you use Koppers liquid KCN—because the worker never comes into physical contact with liquid KCN.

(Drum disposal is easy, too: simply rinse with a minimum of water and they may be re-used, sold or discarded.)

CASH SAVINGS *because accidents are minimized, when you buy Koppers!*

5. SERVICE

Koppers is known for its service! To provide the most dependable, continuous source of supply, Koppers has warehouse facilities for liquid KCN at strategic locations throughout the U.S.A. Koppers Technical Service is always available to show you how easy it is to use Koppers liquid KCN in *your* plating operations.

CASH SAVINGS *because you receive a "plus" in technical and sales service, when you buy Koppers!*

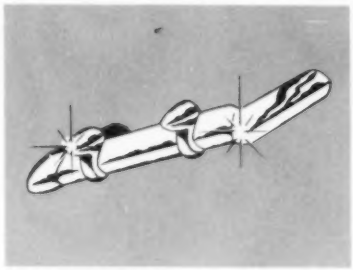
6. COMPANY EXPERIENCE

Koppers, as a producer of synthetic chemicals, is well-known for its quality products . . . for the intensive research that precedes marketing of each new Koppers product . . . for its technical assistance in utilization of these products. Koppers KCN production is continuous and dependable.

CASH SAVINGS *because you can depend on Koppers quality—time after time—and the same, reliable source of supply, when you buy Koppers!*

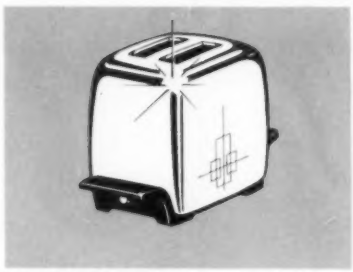
Among satisfied users* of Koppers KCN solution are companies involved with small as well as large-scale plating operations. They range from tiny ball bearing manufacturers to firms who chrome-plate large grillwork and bumpers for the nation's leading automobiles. In fact, almost everywhere you look in the metal-finishing industry, you'll find Koppers KCN solution doing a job!

*Names on request.



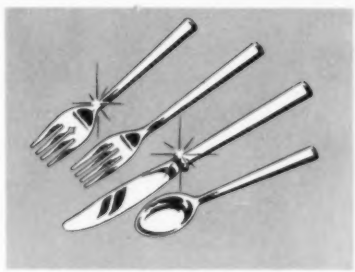
AUTOMOTIVE MANUFACTURERS

Bumpers, grillwork, door and trunk handles on the country's finest cars are plated with Koppers KCN solution.



APPLIANCE MANUFACTURERS

From toasters to "white goods," Koppers KCN solution is used in plating appliances throughout America.

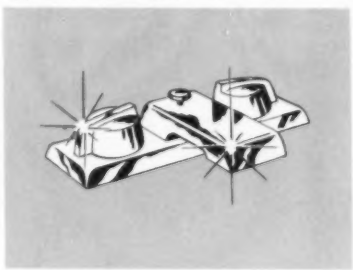


SILVER PLATERS

One of the most recent enthusiastic users of KCN solution is a leading silverware manufacturer.

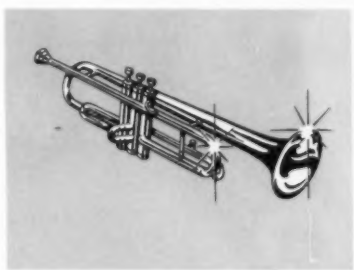
SURGICAL INSTRUMENTS

Fine, accurate steels are chrome-plated, using KCN solution for a number of the leading surgical supply houses.



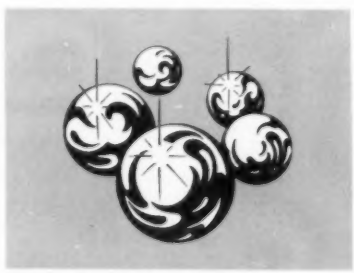
HARDWARE

Many items (ranging from plumbing supplies to drawer pulls) found in the neighborhood hardware are plated with Koppers KCN solution.



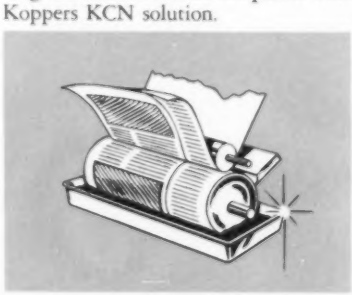
TOOLS and INSTRUMENTS

The care involved in making fine tools and instruments is carried even further by plating with Koppers KCN solution.



BALL BEARINGS

Aircraft engine manufacturers have found Koppers KCN solution convenient, easy-to-use in silver plating fine engine bearings.



ROTOGRAVURE PRINTING

A smooth, evenly-coated copper plate results when Koppers KCN solution is used in plating rotogravure cylinders.

CUSTOM PLATERS

Suppliers who do large, small, long or short run plating work use Koppers KCN solution.

Potassium Cyanide is also used for plating:

COPPER SILVER CADMIUM ZINC GOLD

Bulk handling of **KCN Solution** Saves TIME-MONEY-WORK

If you are now using KCN in your plating operation, whether large-scale or small, we will be glad to show you how easy it is to switch to *liquid* KCN . . . and save money! For complete technical data and price information, write to Chemical Division, Koppers Company, Inc., Pittsburgh 19, Pa.

Koppers also produces:

Sodium Cyanide Solution (26-30%)–a complexing agent manufactured from high purity hydrogen cyanide, reducing to a minimum the amount of contaminating organic chemicals and inorganic salts.

Barium Cyanide Solution (30%)–suggested as a cyanide plating bath additive, particularly in cadmium plating to remove the troublesome effects of carbonates and sulfates in the bath.

Containers for Koppers **KCN solution:**

Available in 4,000 and 7,000 gallon tank cars

. . . in 3,000 gallon tank trucks

. . . in non-returnable 55 gallon drums

for brighter finishes at maximum economy in your plating operation, choose KOPPERS POTASSIUM CYANIDE SOLUTION!

Printed in U.S.A.

C-6-227

NATIONAL SCREW MACHINE PRODUCTS ASSOCIATION TO HOLD ANNUAL BUSINESS MEETING

More than 300 persons are expected to attend the Annual Business Meeting conducted by the National Screw Machine Products Association for the screw machine products industry. The meeting is scheduled for Milwaukee's Hotel Schroeder, April 4 through 7.

Highlight of the four-day conclave will be a series of nine conference sessions, each chairmaned by experts in their field. Topics to be covered include the perpetuation and passing along of a company (important subjects to producers of screw machine parts because of the vast number that are either partnerships or closely held corporations); problems of estimating screw machine products and the cost involved; production incentives for both direct and indirect labor.

Other conferences will cover such subjects as employee evaluation and internal organization; pension retirement and profit sharing plans; ten-year future planning which will cover the entire gamut of company management as it might be 10 years hence; cost control and financial ratio analysis; modernization and replacement of plant and equipment; and merchandising and marketing analysis.

DESIGN ENGINEERING SHOW

"Tomorrow's Products Are Tomorrow's Markets" has been set as the theme for the first Design Engineering Show, at Convention Hall, Philadelphia, May 14–17.

The machine design division of the American Society of Mechanical Engineers will sponsor a conference on design engineering to coincide with the show.

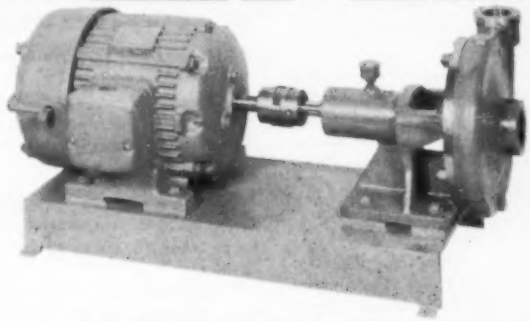
One hundred and fifty companies, of the expected 200, already have engaged space to present displays. Exhibits will include components, materials, finishes, shapes and forms, and services, which are used by design engineers to make end products for consumer and industrial use.

Conference topics will include cost reduction in product design, finding and training men for the design engineering field, selection of engineering materials, the effect of miniaturization upon design, compensating employees for inventions, and the rights of a company employee in inventions he develops.

About 2,000 experts from exhibiting companies will attend to answer visitors' questions.

Remember the AES
Annual Convention
in Washington, D. C.
June 17-21, 1956

"... this Pump has a Patented Mechanical Seal to Reduce Maintenance



... and is Tailored for All Plating Requirements!"

Steadfast announces the addition of a line of Service Pumps for the Plating Industry. These high efficiency centrifugal pumps designed by a proven manufacturer with 35 years experience is your assurance of precision fits and quality workmanship.

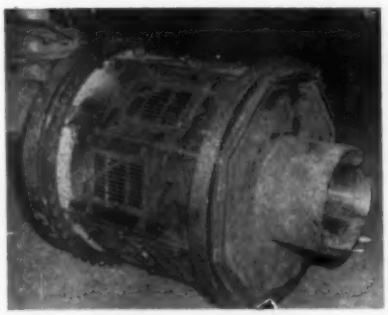
Available in the following Materials: Cast Iron, Stainless Steel, Durimet, Hastelloy, Bronze, Hi-Temp Lucite and others depending upon requirements. Pump Ratings from 300 gph to 12,000 gph. (We invite your inquiries.)

Patented mechanical seal eliminates the troublesome stuffing box and costly down-time. Tests on this mechanical seal have shown two years continuous 24 hr/day operation without any maintenance required.

STEADFAST INDUSTRIES, INC.
4731 W. Madison St., Chicago 44, Ill. • Phone: Columbus 1-7478
(In Canada, Write Armalite Co. Ltd.)

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 400.

When you need work capacity —



call STORTS

Building and re-building equipment for heavy duty metal processing, like this tumbling barrel, is a Storts specialty. The combination of sound, strong, fully penetrated welds and precision fabricating procedures assures long life at full loads, a big service and utility dividend on your investment.

42 STONE STREET — STORTS WELDING COMPANY INCORPORATED — MERIDEN, CONN.

Manufacturers of Welded Fabrications to Specification

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 357.

WASHINGTON CONVENTION NEWS FOR THE FAMILY . . .

June 17–21, 1956

By George E. Best

Here's some information strictly for the better half and the younger members of your family. To make sure they get to see it, why not clip this page and take it home for the bulletin board. Be sure they read it somehow—please!

For the Ladies

Now isn't it just deliciously delightful how this forthcoming trip to Washington will require so many new clothes? Especially when you consider the wide variety of activities, from outdoor events to evening banquet and dance! Yes, start planning now, girls, and catch the old boy as often as you can when he's in a good mood because it's later than you think and June will be soon bustin' out all over (and Kate and Mary and Dolly, too, we hope).

It's a foregone conclusion, of course, that you just won't miss being with the other long-suffering AES wives who have patiently waited and worked all year when they are freed of home cares and toil for a week in wonderful Washington, where there is so much to see and do that a week is hardly long enough.

The Ladies' Program Committee has planned the following attractive features, but there is ample time for supplementing them as you may wish:

June 17 (Sunday)

Get-Together Party in the evening—great fun, so make sure you're among the early arrivals.

June 18 (Monday)

Attend opening business session of convention with hubby—to make sure he gets there and stays awake.

Special luncheon is tentative—the Committee is uncertain about your appetite following this exposure to convention business proceedings.

The afternoon Sightseeing Tour will be one you'll long remember.

The International Fellowship Club Open House in the evening will get you further acquainted and really put you in good spirits (literally) for the rest of the week.

June 19 (Tuesday)

Except for the Aunt Ella Luncheon, which is always a high spot full of surprises, this day is set aside for you to roam as you choose.

June 20 (Wednesday)

This is the day for low heels, and high heels, too. Mt. Vernon, the home of George Washington in a picturesque setting overlooking the Potomac River, will be the object of an afternoon trip—going by bus and returning by boat (no swimming or water skiing at this point, please).

Pleasure galore will come in the evening with a gay Floor Show and Dance.

June 21 (Thursday)

A lighter schedule, but a real treat at the Luncheon and Plato Party.

Climaxing the program in the evening comes the Annual Banquet and more tripping the light fantastic.

June 22 (Friday)

Unofficial but important: To be devoted to getting father in shape for the ride back home!

Please note also, ladies, that many of the following events on the proposed children's program coincide with yours. Thanks for listening, and we'll be seeing you in June in the city which digs deeper in dad's pocket than you do!

For the Young Folks (Age 7 to 14)

Young people go for something new, so let's get with it, boys and gals. This is the first time a special program has been worked up for AES sons and daughters, so be sure to get in on it. Then to your children and grandchildren some years hence you can say: "Way back in 1956, when I was small, I attended the first junior convention program, and those were the good old days!"

To save extra strain on your eyes, the features are listed without added chatter:

June 17 (Sunday)

Get-Together Party.

June 18 (Monday)

Luncheon and afternoon Sightseeing Trip.

International Fellowship Club Open House in the evening.

June 19 (Tuesday)

All-day trip, including lunch, touring Washington National Airport and airlines maintenance facilities.

June 20 (Wednesday)

Afternoon outing to visit Mt. Vernon by bus and boat.

Floor Show and Dance in the evening.

June 21 (Thursday)

All-day trip to the Washington Zoo (National Zoological Park) and/or the Federal Bureau of Investigation.

You will be most welcome to attend the Banquet on Thursday evening—don't forget to buy a ticket, though, for the Banquet is not included in your registration fee which is only $10. Pre-registration cards for you young folks will be included with the hotel reservation cards to be sent to your dads. **Be sure** to send in the pre-registration card, for carrying out the special events of the young folks' program depends on having at least 40 register. Remember also to remind pop that most Washington hotels make no room charge for boys or girls up to 14 years old sharing the same room with their parents.

Copper plating process adapts to various needs

What more efficient chromium means

Higher cathode efficiency and wider bright plate range of Unichrome SRHS* Chromium Solutions mean better operations. Users are plating up to two times faster, saving power, stepping up output from existing equipment, and reducing rejects to a remarkable degree. Bulletin SRHS-2 tells more. Send for it.

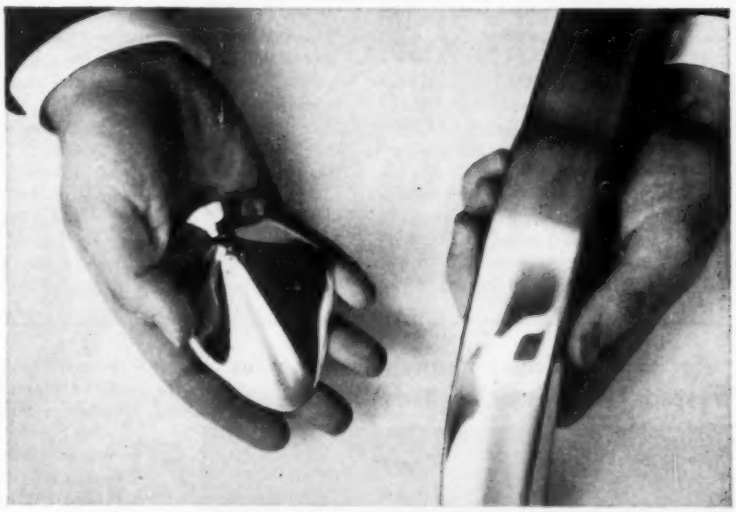
**Trade Mark*

Successful barrel for plating chromium

Small parts are being quality plated easily, quickly and with great economy today in Unichrome 24-inch batch-type Chromium Plating Barrels. Batch plating permits time to be varied to control deposit thickness. The operator loads parts into the drum, unloads from a tray minutes later. Work shows no contact marks, "burning" or "missing." The whole unit occupies only 4x6 ft. floor space.

METAL & THERMIT CORPORATION
100 East 42nd Street, New York 17, N. Y.
In Canada: Metal & Thermit-
United Chromium of Canada, Limited, Toronto

Non-cyanide Unichrome Pyrophosphate Copper Process provides deposits of unusual nature—users benefit



Two of the finishes obtainable with Unichrome Copper. Left: Lustrous plate that needs no buffing prior to bright nickel. Right: Satin deposit (upper portion of steel part) that buffs fast and easy to a high color (shown on lower portion of part).

The Unichrome Pyrophosphate Copper Process can be controlled to suit a number of production needs exactly. Newly perfected addition agents, when added to the basic bath, alter the deposit without detracting from its time-proved features.

TO BUFF OR NOT TO BUFF

With one agent, a lustrous deposit is produced which can eliminate buffing. With another, a satin finish is produced which is ideal for buffing – permitting buffing of the free-flowing, ductile copper rather than base metal or subsequent nickel plate.

SMOOTHNESS IS BASIC

Whether used with or without the addition agents, Unichrome Copper deposits are noted for their essential smoothness. In addition, the plating bath has good leveling action, and produces unusually fine grained deposits.

EXTRA BONUS

The Unichrome Pyrophosphate Copper solution contains no cyanide. Its use therefore minimizes the cyanide disposal problem of the plant. As one user recently put it, "a pyrophosphate-type copper solution was selected because of its wide brightness range and because it does not present a serious waste disposal problem."

COMPATIBLE DEPOSITS

Unichrome Copper contributes also to better and more economical copper-nickel-chromium finishing. Its deposit proves ideally receptive for nickel plating, avoiding passivity problems and need for activation treatments.

Send for detailed information.

AES NEWS

PLATING EDITORIAL BOARD ADOPTS OWN BY-LAWS AT CHICAGO MEETING

A PLATING by-laws committee, headed by AES Past President Fred Fulforth and comprising Past President Arthur Logozzo, Les Diveley and Dr. Abner Brenner, presented a full blown set of regulations for adoption at the January 28 and 29 meeting of PLATING Editorial Board. Designed to serve as a guide for future editorial committeemen, the by-laws outline in detail the duties of the board. After tentative approval, the ratification was deferred to the April meeting of the board pending minor revisions.

The day-and-a-half meeting took action on the following items of business: approved ten simultaneous educational sessions at the forthcoming Washington convention; commended Dr. Abner Brenner for obtaining more than 40 papers, abstracts of which were in receipt by the deadline, January 1st; voted in favor of the principle involved in the 13th issue of PLATING magazine; recommended to the Executive Board that all branch news, excepting announcements, be forwarded to National Headquarters for processing before submission to other magazines for publication; recommended that technical proceedings of conventions with discussion be published together in a single issue of PLATING; recommended to Executive Board to have rescinded the Supreme Society resolution of 1953 whereby complete technical proceedings were offered to members in a separate bound volume; lauded PLATING editorial department for "excellent-looking" magazine; and gave vote of thanks to the Chicago branch and Udylite Corporation for their thoughtful hospitality.

The next meeting of the Editorial Board is scheduled for April 20, 1956 at AES Headquarters, Newark, N. J. Present at Chicago meeting: Chairman P. Kovatis, L. Diveley, H. Wiesner, H. McAleer, A. Brenner, F. Fulforth, AES Pres. C. Kelly, L. Weeg, R. Harr, F. Scott, J. Capuano, W. Tucker.

EXECUTIVE BOARD STUDIES PROBLEM OF SURPLUS PAPERS FOR PLATING MAGAZINE

For several years, the Society faced the problem of an insufficient backlog of papers for PLATING magazine. Today, through the concerted efforts of National Headquarters staff, Editorial Board and other Society groups, more than 100 manuscripts are available for publication within the next 12 months. This matter—one of 42 items on the agenda—precipitated much discussion and concern at the January 14 meeting of the Executive Board in New York. Among the several suggestions ventured to resolve the surplus papers problem were the following: (1) exclude convention papers from PLATING magazine and publish them in the TECHNICAL PROCEEDINGS; (2) publish convention papers altogether in one issue of PLATING magazine. Action on this problem was deferred to the next board meeting pending further study.

Other business acted upon: heard a progress report on the 1956 Washington convention from chairman Arthur Pierdon; deferred a plan for a 13th directory issue of PLATING magazine to the next meeting; approved an increase in PLATING advertising rates effective May 1, 1956; heard more than 20 suggested innovations for

St. Joseph Valley Branch Announces Wysong Candidacy for 3rd Vice-President

RALPH D. WYSONG

Personal—Name, **Ralph D. Wysong**; age, 55; residence, 3511 Chevy Chase, South Bend, Ind.

Employer—Studebaker Division, Studebaker-Packard Corporation.

Position—Chemical Engineer in charge of Finishes.

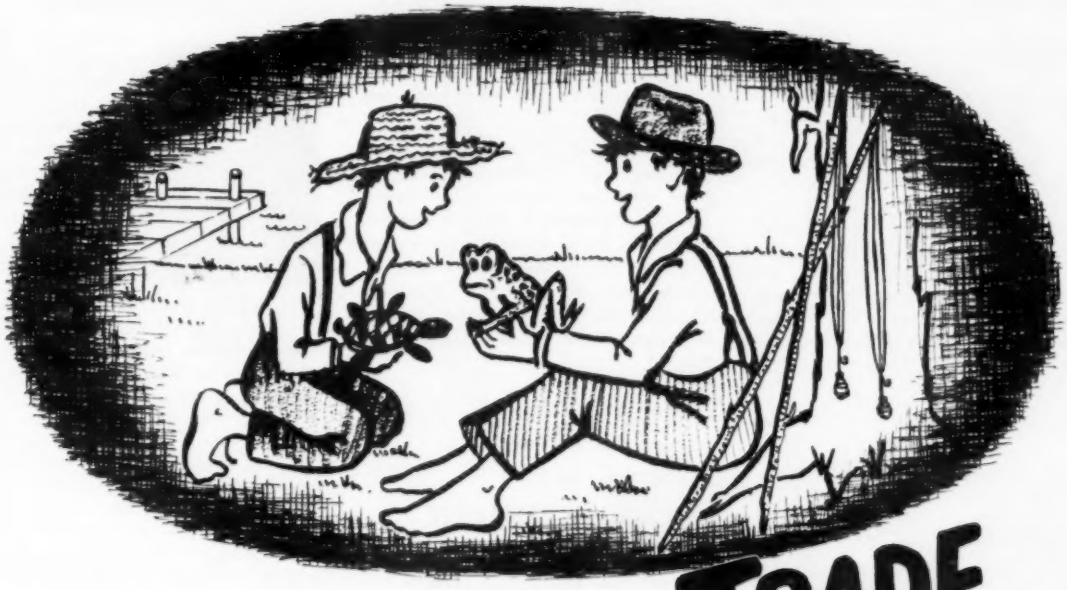
Education—Graduate in Chemical Engineering, Purdue University, 1923; Registered Professional Engineer (Ind.).

AES Activities—Past President St. Joseph Valley Branch, after working his way up through all the offices; Branch Delegate to all National Conventions since 1943; Member of Project 15 Committee on "Accelerated Corresion Tests". Member of the Planning Committee for the 1952 Chicago Convention; Chairman of one session of the Chicago Convention; Mrs. Wysong served on the Ladies' Entertainment Committee during the 1952 Convention.

Technical Societies—(1) Member and Past Chairman of the Notre Dame Chapter American Society for Metals and on the Executive Committee for eight years; (2) Member and on the Advisory Board of the Industrial Waste and Water Resources Committee of the Automotive Manufacturers Association; (3) Member of the American Society for Testing Materials Committee B-8 on Electro Deposited Metallic Coatings; (4) Member of the American Society for Testing Materials Committee D-15 on Engine Anti-freezes; (5) Member of Society of Automotive Engineers (SAE) Sub-Committee on Upholstering Materials.

Non-Technical Activities—(1) Active in State and Local Conservation projects for over 20 years; (2) Active in Boy Scout work. Past Scout Master and Senior Scout Advisor. Present member of the Scout Council Executive Board. He is a wearer of the Silver Beaver award; (3) Active in Church work and an officer on his Church Board; (4) Active in lodge work.

Note—The Studebaker Division has granted their permission for Mr. Wysong's candidacy and will grant him the necessary time for Society activities as a National Officer.



LET'S TALK TRADE

YOUR NICKEL RESIDUES FOR OUR NICKEL ANODES

YOU

Produce nickel residues in the form of peelings, strippings, hangers, racks, baskets, etc. . . . WE WANT THEM.

WE

Will trade cathodes, butts, swords, clips, rods, etc., that will meet your regular supplier's specifications for recasting into anodes; or, we can supply cast or rolled anodes. . . . YOU WANT THESE.

PHONE, WIRE, WRITE . . LET'S TALK TRADE

Stainless Steel Corp. of America

OHIO EDISON BLDG. · YOUNGSTOWN 3, OHIO

RIverside 4-4123

FOR FURTHER INFORMATION, USE READER SERVICE CARD: INDICATE A 359.

name of Society journal; commended 1st Vice Pres. Samuel Heiman for an "exceptionally well done" film list which was distributed to branch officers recently; deferred for further study a plan to mail PLATING in "sleeves;" heard several bids for the printing of Society publications; voted to award non-member authors of PLATING articles one year's free subscription to PLATING; received reports from convention chairmen of Montreal and Detroit; deferred branch exhibits awards proposal pending further study; voted to increase span of Society publications index to cover 1953 and 1954; heard plan to publicize advantages of Society membership in PLATING regularly; voted to discourage practice of releasing membership lists by certain branches; confirmed acceptance of Mississippi Valley branch temporary charter; and acted upon many other matters.

Present at the meeting: Pres. C. Kelly, Vice Presidents S. Heiman, F. Eddy, H. Head and Past President R. Schaefer; Executive Secretary P. Kovatis, PLATING Editor A. Doria, PLATING Advertising Manager and Production Manager G. Burnley and R. Huntley respectively; Cleveland convention chairman E. Combs; Washington convention chairman A. Pierdon.

SUBCOMMITTEE NAMED BY WRISBERG

Wrisberg

Arthur P. Wrisberg of Davies Supply and Manufacturing Company and AES Research Committee Finance Vice-Chairman, has named 11 subcommitteemen to spearhead an accelerated drive for Sustaining Members in the U.S. and Canada. This subcommittee will be responsible for branch Sustaining Membership efforts in their area under the aegis of Wrisberg.

In making the appointments this month, Wrisberg lauded the efforts of branches which as of this year have achieved the best Sustaining Membership showing on record. "We are greatly appreciative of the fine showing to date," said Wrisberg, "but credit must also go to the progressive firms which are fast coming to recognize the importance of investing in research today for tomorrow's gain."

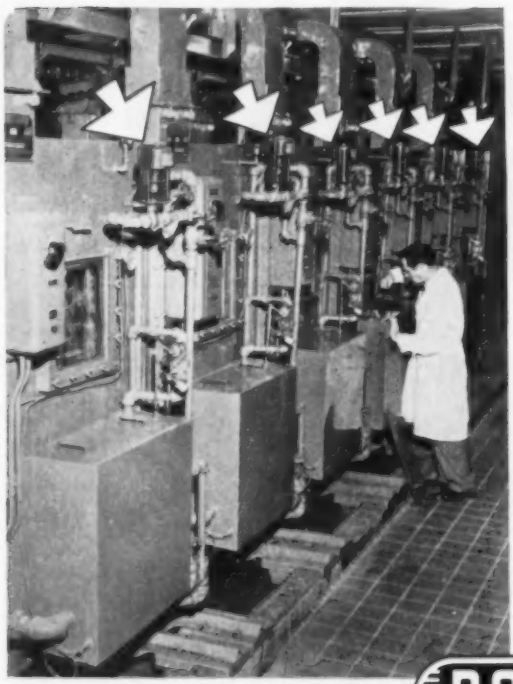
The subcommittee and areas of branch responsibility: H. L. Kellner, New England; M. Nadel, New York and New Jersey; A. H. DuRose, Ohio; R. J. Racine, Michigan; J. Lockerbie, Indiana and Kentucky; R. Kotz, Rockford, Ill.; Minnesota and Wisconsin; L. C. Kingsbury, Baltimore and Washington, D.C.; C. Hohner, Southeastern; T. Stabile, West Coast; A. P. Wrisberg, St. Louis, Kansas City, Colorado and Southwest; C. D. Short, Canada.

AES SUSTAINING MEMBERSHIP PROGRAM

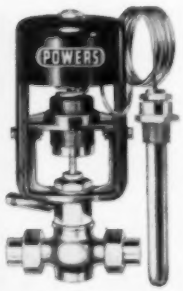
Eight more progressive firms have joined the AES Research effort through the important medium of the Sustaining Membership program. The new firms are:

Firm and City	*Branch Credit*
American Anodizing Corp. Quincy, Mass.	Boston
American Zinc Sales Co. St. Louis, Mo.	St. Louis
Alco Chemical, Inc. Dearborn, Mich.	Detroit
L. H. Butcher Co. Los Angeles, Calif.	Los Angeles
Mefford Chemical Co. Los Angeles, Calif.	Los Angeles
Northern Electric Co., Ltd. Montreal, Quebec, Canada	Montreal
Plating Engineering Co. West Allis, Wis.	Milwaukee
A. T. Wagner Co. Detroit, Mich.	Detroit

Number of Sustaining Members supporting AES Research through this month	340
Number of Sustaining Members supporting AES Research through last month	332



AT
WYANDOTTE CHEMICAL CO's.
Modern research laboratories
METALWASH Spray Washer is controlled by POWERS No. 11 Temperature Regulators



SIMPLICITY of POWERS

No. 11 Self-Operating Regulators, plus their years of reliable control plus availability of SERVICE, in 60 Cities, if required,—are reasons why equipment manufacturers like to use POWERS No. 11 regulators shown above. Bulletin 329 describes their many points of superiority. Write for a copy. (c5)

THE POWERS REGULATOR CO.
Skokie, Ill. • Offices in 60 Cities • See your phone book

Over 60 Years of Automatic Temperature and Humidity Control

YOUR BEST BET

AMERICAN ELECTROPLATERS SOCIETY

RESEARCH PROGRAM

IS YOUR COMPANY KEEPING

UP!

300 COMPANIES

THREE HUNDRED INDIVIDUAL companies are actively supporting the American Electroplaters' Society Research Program. These companies have found that the benefits, both direct and indirect they are deriving from their sustaining membership make it an extremely worthwhile investment.

Direct Benefits

Regular printed reports on developments of all research projects.

Indirect Benefits

Strengthening of the electroplating industry with greater knowledge and improved methods and processes through research.

If you are not already a Sustaining Member, send your check for $100.00 to the American Electroplaters' Society, 445 Broad Street, Newark 2, N. J.

AMERICAN ELECTROPLATERS SOCIETY

445 Broad St., Newark, N. J.

INVEST NOW—THE AES RESEARCH PROGRAM

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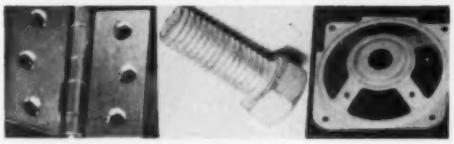

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Nickel anodes up to 93 inches in length—cast in new shell mold process. This unique method of casting produces anodes of the highest purity—with optimum metallurgical properties. Density of anodes is at a maximum and excellent surface is obtained. These factors account for longer life in plating bath.

NICKEL CASTING PRICE SCHEDULE

ANY QUANTITY

15c PER POUND

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Write or wire for best price and delivery on the following Anodes:

Copper-Electro Deposited
Copper-Cast Round 3" Dia.
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Copper-Cast Balls
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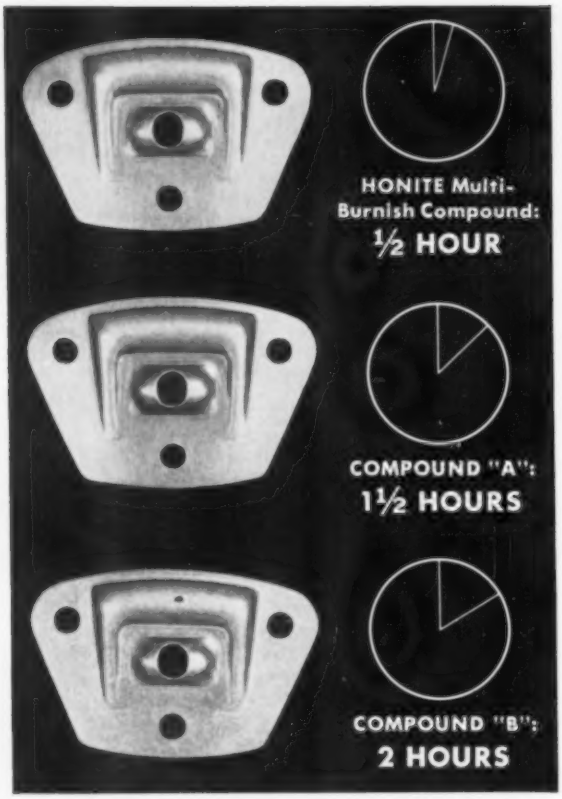

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A leading camera manufacturer found that ball burnishing these parts with two competitive barrel finishing compounds took from 1½ to 2 hours per run. By switching to the HONITE Method and HONITE Multi-Burnish Compound, finishing time was cut to 30 minutes. Results? Three to four times more parts finished per day with the same equipment!

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3M

Meet Mr. President

Perry Burnham is a native of Grand Rapids, Michigan and attended public schools therein, graduating in June of 1940. He served 41 months of his military service in World War II overseas with the famed 32nd Red Arrow Infantry. Upon returning to Grand Rapids he attended Grand Rapids Junior College. He affiliated with the metal finishing industry starting in 1948 when he joined the engineering staff of the J. C. Miller Co. Subsequently he became metal finishing equipment engineer for this concern. He became associated with the Hanson-Van Winkle-Munning Company of Matawan, New Jersey as a result of the merger of the two concerns in 1954, and has recently been appointed Conveyor Sales Engineer by the Hanson Company. Perry has been an active member of the Grand Rapids Branch AES, serving first as Vice President in 1954-55 and elected to President in 1955. Burnham is married and the father of three children, two boys and a girl.

Burnham
Grand Rapids Branch

Herbert Kennedy was born February 10, 1911 in Lakewood, Ohio. He is married and has three children. Herb was graduated from the Case School of Applied Science (now Case Institute of Technology) with a BS degree in Chemical Engineering in 1933. He immediately joined the E. I. du Pont deNemours & Co. Inc. and worked in the Experimental Lab of the Grasselli Chemical Co. In 1936 he was transferred to the Zinc Sales Dept. later known as Electrochemicals, in the Detroit office. In 1944 he moved to the Cleveland District and in 1946 to the Cincinnati Branch Office as Technical Representative on Sodium Products. Herb joined the AES in Detroit in 1936 and served on the Board of Managers and various committees. He transferred to the Indianapolis Branch eleven years ago and became 1st Vice-President in 1954–55.

Kennedy
Indianapolis Branch

Besides membership in the AES, with whom he served on the Tri-State Regional for two years, he is a member of the ASME. His occupation has limited his home town activities but he finds time to engage in Cub Scout Committee work.

25 Years Ago

In the March issue (1931) of The Monthly Review, O. E. Servis is concerned with the idea of cooperation between the AES and the Heat Treaters Research Committees. The rest of the editorial speaks of the necessity of such cooperation in order to clear the misconceptions that remain in the minds of the manufacturers and consumers about the corrosive and erosive values of different materials. The editorial ends with a hope that the next annual meeting would legislate so that such cooperation can be accomplished.

There is an article by Dr. O. P. Watts on "Buffering the Nickel Solution;" another by C. E. Clindinin on "Production Nickel Plating at Low *p*H." Even then, a quarter of a century ago, there was concern over Nickel! (Plus ça change, plus c'est la même chose).

George Gehling, AES president, reported on the Research Conference which took place in conjunction with the Chicago Branch Yearly Meeting and Banquet.

This was a 50-page book, crammed with information for members and carried no advertising.

10 Years Ago

The March 1946 issue of Monthly Review was packed with ads. It was also packed with meaty articles: "Lead-Tin Alloy Plating" by Carlson and Kane; "Adhesion of Electrodeposits" by Faust; "Electroplating on Aluminum" by Meyer; and a Report on AES Research Project No. 3 by Ferguson which dealt with tests for measuring the degree of adhesion of the plate.

Some twenty branches reported in Branch News. Seven of these were "double reports" wherein two reports were included. (Branches took no more advantage of promptness then than they do now.)

This was a 112-page issue, plus covers, digest size, with approximately 60 per cent ads.

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The abbot and the Bishop's Candlesticks

The Bishop was upset. How could he possibly have 500 dull, tarnished brass candlesticks polished and gleaming in time for tomorrow's special candlelight services?

The *abbot* was quite calm. He *knew* the answer to the Bishop's dilemma and in less than twenty-four hours, he returned from his laboratory with the candlesticks – bright and glistening.

How did he do it?

Articles made of brass and other metals may be readily burnished and tumbled with Abbott Burnishing Materials. Made in six scientifically designed shapes, Abbott Burnishing Materials make efficient and uniform contact on metal parts and castings of every conceivable size and shape. Economical to use, they are *deep hardened* and have a mirrorlike glass-hard surface for extra long life. Combined with the Abbott Vertical Tumbling Barrel, they make the perfect barrel finishing combination.

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AES Membership Report

ELECTIONS

Adelaide: E. H. Serls
Baltimore-Washington: J. C. Withers
Capitol District: W. R. Allison, F. P. Bucci, C. R. Williams
Central Michigan: W. L. Boyes, D. Martin, E. J. Vogt
Chicago: R. J. Johnson, C. J. Kennedy, G. G. Kraft, I. R. Levinson, J. J. Pawlak, M. G. Willigman
Cincinnati: B. Barrett, T. E. Barringer, M. B. Hill, H. F. Kemp, R. H. Moss, G. G. Seymour, S. J. Shaw
Cleveland: C. W. Parke, S. E. Pross
Dayton: G. M. Collins
Detroit: S. J. Cascio, R. L. Drummond, J. R. Heizmann, J. R. Otto, C. F. Tower, R. C. Trees
Hartford: T. F. Hussey, L. Morgan, A. G. Pasquini, J. A. Pepe
Los Angeles: J. Abramson, L. R. Boutchard, O. E. Grisht, L. M. Henderson
New York: V. Capozzi, B. Brooks, J. Marymont, W. O. LeFevre
Pittsburgh: R. R. Hartung, J. W. Mechtly, E. F. Sokalski
Providence-Attleboro: W. E. Collins
Rockford: R. Bertrand
Saginaw Valley: J. Gold, J. D. Horner, H. Welch
St. Louis: W. L. Aves, J. W. Beune, A. W. Hunning, E. E. Mauer, W. Sullivan
Southeastern: D. L. McArthur, D. E. Speer, Jr.
Syracuse: R. S. Andrews, C. L. Astifan, H. C. Barth, Jr., R. Downs, B. W. Dutter, W. R. Hatter, C. J. Hopkins, F. H. Mulholland, H. P. Munger
Toledo: J. T. Follas
Toronto: B. Laws, R. J. Lucy
Waterbury: T. C. Bate, J. Guidess, G. A. Muscio, G. A. Ritchie
Western Ontario: G. S. Bustard
Member-at-Large: E. F. Ben-Menachem, Tel-Aviv, Israel, E. Costa, Jr., Webster, Mass., J. Chadwick, Birmingham, England, H. E. Freiheit, Phoenix, Arizona, S. J. Georgoulis, Ormond Beach, Florida, R. W. Golledge, Surrey, England, M. Holt, Youngstown, Ohio, C. Hyde, Waynesboro, Virginia, D. H. Lloyd, Birmingham, England, H. L. Reis, Birmingham, England, F. Soderstrom, Kungsoer, Sweden, L. Vitiello, Milano, Italy, J. W. White, West Monroe Louisiana

REINSTATEMENTS

Baltimore-Washington: L. C. Kingsbury
Detroit: Peter Hoeffel, R. J. Signorino, (returned from armed forces)

TRANSFERS

Capitol District: G. A. Miller, from Rochester
Cleveland: O. R. Jackson, from Newark, W. J. Pierce, from Detroit, W. S. Springer, from Grand Rapids
Detroit: Dr. G. Dubpernell, from Waterbury
Hartford: H. L. Mitchell, to Springfield
Los Angeles: E. H. Babcock, from Indianapolis
New York: W. Manson, to St. Joseph Valley, W. R. Phillips, to Member-at-Large
Rockford: C. R. Earl, to Mississippi Valley, C. Dunk, to Mississippi Valley
Waterbury: Dr. G. Dubpernell, to Detroit

RESIGNATIONS

Cleveland: R. H. Christenson, R. F. Getson, W. E. O'Berg, H. A. Simons
New York: J. Brust, W. Jackman
Syracuse: W. C. Wood
Waterbury: D. R. Nalven

SUSPENSIONS

Cleveland: C. Norris, S. P. Pozone, L. C. Sobey
Indianapolis: R. M. Branagin, E. L. Burton, H. N. Myers
Montreal: C. Claridge, R. D'Esterre, J. Garcia, W. J. Douglas, K. R. Lane, J. A. Larue, F. Loiseau, A. G. Macdonald, A. Picton, K. McColm, L. Robillard
Rochester: H. A. Cameron, W. Ketchmere, E. A. Nill, D. Philips
Rockford: D. E. Chapman, E. N. Dreier, F. J. Florin, R. Johnson, R. Phillips
Saginaw Valley: A. Franklin, Jr., Dennis Keeley
Syracuse: H. Spencer

DEATHS

Chicago: H. Faint
Cincinnati: J. W. Magly
Syracuse: A. M. Hoehn

Note to thief: That auto has poison!

Peter Kovatis of Cedar Grove, N. J., reported his car stolen and added this warning to the thief: In the car are two bottles of extremely poisonous acid.

Kovatis, executive secretary of the American Electroplaters' Society of 445 Broad St., Newark, N. J., told police one bottle contains cyanic acid and the other hydrochloric acid.

Note:

This cartoon was drawn by Cy LaManna who is a member of the Newark Branch. Apologies to Al Capp, of course, but police had little luck despite a four-state alarm and some fifty newspapers carrying the story. It must have been a pair like these.—Ed.

ULTRASONIC CLEANING BY THE SQUARE FOOT

Recent improvements in ultrasonic power-generating equipment, and the perfection of hermetically-sealed transducers operating at 40 kc/sec, have now made it economically feasible to apply ultrasonic cleaning to areas measured by the square foot. Up to now, cost and technical problems have largely confined the benefits of this fast and efficient technique to relatively small units.

The large, uniform radiating surface of the transducers makes them particularly suitable for the removal of buffing compounds, radioactive contamination, soldering flux, plaster, carbon smut, etc. The transducers can also be used for other processes such as quenching, plating, pickling, descaling and dyeing. The cleaning action penetrates deeply into blind holes and other areas difficult or impossible to clean by conventional methods.

The Branson LF-15 Transducers have a radiating surface 2⅝"x6", with thick barium-titanate driving elements that transmit the energy through the top of the stainless-steel housing directly into the cleaning solvent. The modular design of the transducers facilitates a wide choice of flush and focused arrangements of banked transducers.

Generator-Transducers combinations are available with radiating areas from 0.25 to 10 square feet:

Sonogen® Model	Transducer Radiating Area Square Ft.
AP-25	0.25
APT-100	1.00
APT-400	4.00
P-1000	10.00

Cost of complete equipment, per square inch of radiating surface, ranges from $23 down to $14. We will be happy to send you complete information on request.

BRANSON ULTRASONIC COMPANY
168 Richmond Hill Ave., Stamford, Conn.

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GATES PERIODIC REVERSERS—FOR BETTER PLATING!

GATES Periodic Reversers make possible:

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- Thin plates of unusual uniformity and high corrosion resistance
- Brighter, smoother deposits requiring little or no polishing or buffing
- Satisfactory results with substitutes for scarce, restricted or expensive plating metals
- Synchronous motor timers assure accurate and stable time settings

100 Amp. Unit Illustrated $150

Other Periodic Reverser Units supplied from 50 Amps to 3000 Amps

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- Bench or floor models from 25 Amps to 1000 Amps
- Stepless, variable control, or tap switch control available
- Magnetic starters furnished complete with overload thermal relays and rated for continuous maximum duty
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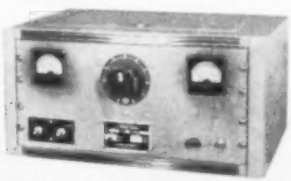
- Remote control units supplied



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Compare the present price you are paying for nickel . . . if you can get it . . . with the current price of zinc.

Zinc treated with KENVERT films, in many cases, can produce brightness and sales appeal, as well as corrosion protection, equivalent or superior to nickel.

Because zinc is a soft metal, and where hardness is a factor, an additional lacquer film may be necessary.

It will pay you to investigate KENVERT chrome sealer bright or colored films immediately. Send us detailed information on your requirements. Our laboratory is ready to consult with you or treat samples at no obligation.

KENVERT acid solutions are packaged in handy Polyethylene steel drums. Some are available in powdered form.

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INDICATE A 368.

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Reception and Cocktails 6:30 P.M. — Banquet 8:30 P.M.

Subscription: $25.00 per person

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BRANCH NEWS

ALLENTOWN-READING

Branch Rejuvenated

The Allentown-Reading branch of the AES held a very timely "rejuvenation" meeting in January. The success of this meeting was largely due to the attendance of **Pete Kovatis,** our national executive secretary. Due to badly lagging attendance, the need for this type of meeting was apparent—and in a "Town Hall" style, an open discussion was held on ideas and suggestions for improving the meetings and attendance. Many worthwhile ideas were discussed, and committees were appointed to visit other branches, work on a membership drive, and handle local publicity. It was also decided to try a different meeting night, and to personally contact each absent member before the next meeting.

From the general attitude of the members present, plus the help and advice of Pete Kovatis, president **Lee Kreider** of the Allentown-Reading branch feels that this is the beginning of a bigger and better branch.

W. E. WALTER, JR., Librarian

SOUTHEASTERN

All Is Ready for the Annual Meeting

Our regular monthly meeting was held on Friday evening, January 13, 1956, at the Belmont Steak House, Atlanta, Ga. The meeting was called to order at 8:30 P.M., **Clyde Stovall** presiding, 36 members and guests present, to include 8 welcome guests from Atlantic Steel Company of Atlanta, Ga. Minutes of the preceding meeting were read and approved as read. **Richard Russell,** chairman of the educational session committee gave a generally favorable report of the progress made thus far relative to the technical educational session. **H. R. Stogner Sr.** displayed the printer's proof copy of the program, stated that the program committee was near completion of their task, and recommended that all committees and all members combine their efforts toward publicity. **George Taylor,** of the publicity committee advised that several mailings had been made and one more notice would be sent out prior to the session date. Taylor also advised that the American Society of Metals, local branch, had been personally contacted at their last regular meeting by **Ed Logan,** and were invited to our February session. **Tom Rogers** introduced our guest speaker for the evening; **Allen T. Baldwin,** manager of flux sales of the Hanson-Van Winkle-Munning Company who presented a most interesting talk on Hot Dip Galvanizing and Hot Tinning, thoroughly and elaborately illustrated by slide projections. After the usual question and answer session, (in which we were happy our Atlantic Steel visitors took an interested part) **Chas. Lewis** told us some of Baldwin's personal history and study in the hot dip field which has included plants, tours, and lectures in the United States and Europe. There being no further questions nor business the meeting was adjourned at 11 o'clock.

ROBERT H. PROBERT, Ass't. Secy. & Treas.

BALTIMORE-WASHINGTON

Theory of Anodized Films by R. F. Hafer

The January meeting of the Baltimore-Washington branch was called to order at 8:15 P.M. by president **Metzger** in the Marling House in Baltimore.

The first order of business was the adoption, by the branch of a new "Procedure for the Election of Delegates and Alternates to the National Convention of the American Electroplaters' Society." **James C. Withers** was elected to membership in the branch.

The speaker of the evening, **R. F. Hafer,** Reynolds Metals Company, Louisville, Kentucky, was introduced by librarian **Edward C. Bertucio.** In delivering his talk, "Anodizing Aluminum," which he presented in a very thorough and com-

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NICKEL BRIGHTENER
CAN HELP YOU

- BRIGHTER—Equal to best still tank quality
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- LOWER COSTS—8 oz./100 gals. to start and 2 to 5 oz. addition/500 amp. hours
- NO RETURNABLE CONTAINERS—In 1 gal. jugs

WRITE FOR TECHNICAL BULLETIN ON BARREL NICKEL PLATING

TRUE BRITE CHEMICAL PRODUCTS CO.
BOX 31C — OAKVILLE, CONN.

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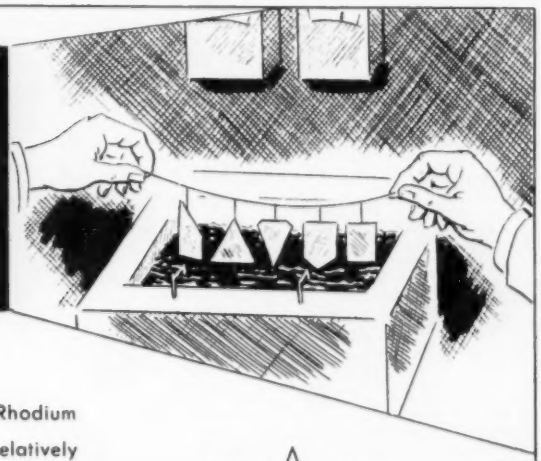
Rhodium
ELECTROPLATING SOLUTIONS



White, hard and highly resistant to corrosion, Rhodium Electroplate is a precious metal, available at relatively moderate cost. Its characteristics make it advantageous for use in the manufacture of Jewelry, Giftwares, Accessories and many other applications. Consult us about your specific plating problems.

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prehensive manner, Hafer discussed the three basic types of oxide films formed, the theory of electrolytic oxide film formation and how the alloy effects the appearance, structure and properties of the film. He outlined the basic process procedures, gave a general process description and pointed out how the corrosion, abrasion and electrical resistance of aluminum can be decidedly changed by anodizing.

The length of the question and answer period which followed attested to the interest in his subject.

CARL H. THIEDE, Secretary

CAPITOL DISTRICT

New Committees Named

On January 9, 1956, the Capitol District branch held its regular monthly dinner-meeting at Panetta's Restaurant in Menands, New York.

"TREMENDOUS HELP"

"Your course has been of tremendous help in clearing up our problems," writes plating executive W. H. Blanck, of the Stewart Warner Corp. You too will find this astonishing home study course of tremendous help if plating is your problem. Why not investigate? No salesman will call. Write to Joseph B. Kushner, Electroplating School, 115 Broad Street, Stroudsburg 30P, Penna.

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Analytical Measurements, Inc.
585 Main St., Chatham, N. J.
Instrument size: 3 x 5⅞ x 2½ inches
Case size: 3¾ x 6½ x 4¼ inches
Weight with accessories: 3 lbs.
$125.

Analytical Measurements, Inc.
585 Main Street, Chatham, N. J.
Please send full information about your pocket pH meter to:
Name
Company
Address
City State

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After dinner **Edward Raymond**, the branch librarian, introduced the guest speaker **Harold Mitchell**, technical representative of the Chemical Corporation, who spoke on "Chromate Coatings." Mitchell used colored slides to illustrate the highlights of his educational talk. The members questioned the speaker on the many practical applications for chromate coatings.

Past president **F. A. Infield** gave a brief introduction on his favorite pastime, fishing, prior to a movie on the subject shown by **Michael Guarneri's** son, Donald.

Frank Hammond announced that his employer, the Sprague Electric Company, has signed up for a sustaining membership.

President **Paul Callahan** appointed **Theodore F. Duvall** as branch historian. Also, the following committees were appointed:

Nominating Committee: **Frank W. Hammond,** chairman; **Frank Bucci, Victor Capogna, Theodore F. Duvall, Robert H. Hill, Herbert T. James.**

Spring Outing Committee: **Donald M. Kollath,** chairman; **James D. Barone, Leonard Brightman, Nicholas J. Cilberti, Arthur I. Eisner, Rocco Robelotto.**

Christmas Party Committee: **Edwin C. Frieberg, Jr.,** chairman; **Thomas A. Barile, Eric A. Berical, V. Peter Greco, William A. Nelson.**

With the election of **William R. Allison** and the transfer of **George A. Miller** from the Rochester branch, the Capitol District branch now has 55 members.

CHARLES SCHENK, JR., Secretary

CENTRAL MICHIGAN

Vanden Berg on Finishing Aluminum

Vanden Berg

The Central Michigan branch held its January meeting at the Hotel Porter, Lansing, Mich. on Tuesday, January 10, 1956. Speaker of the evening was **Russell Vanden Berg** who discussed "Finishes on Aluminum and Its Alloys." Subject was of such interest and so well presented that the 52 members and guests kept Vanden Berg until after midnight answering questions.

G. S. WOODRUFF

CHICAGO

Principals of Chicago branch annual meeting, January 28—Left to right, AES Past President Walter Pinner, speaker; Phil J. Ritzenthaler, speaker; Ralph Wysong, moderator; Dr. Russell E. Harr, program chairman; R. Scott Modjeska, banquet chairman; and Joseph M. Andrus, speaker. More than 300 attended the educational session while over 1000 took part in the banquet at the Conrad-Hilton Hotel. It marked the 44th year that the Branch has sponsored this event

COLUMBUS

A Meeting In a Plant

The regular monthly meeting of the Columbus branch was held on Friday, January 13, at 7:00 P.M. in conjunction with a tour of The Buckeye Steel Castings Company plant.

Following a tour of the plant there was a luncheon prepared by the company which was concluded by a question and answer session with answers being supplied by the company officials. Following this a short business meeting was held.

President **Nathan Koslin** thanked the company officials for their hospitality and then called upon Columbus branch rep-

resentative to the Tri-State Committee, **Walter Denney,** who reported that final arrangements were being made for the Annual Tri-State Regional Meeting in Dayton on March 10, 1956. Tickets will soon be available to Columbus branch members at a cost of $6.50 each.

MICHAEL FARR, JR., Secretary

DAYTON

Swift on Metallurgy

The regular January meeting was held at the Hotel Biltmore. Two new members were elected: **Wilbur Black,** plater, The Ex-Cell-O Corp., Lima, Ohio and **George M. Collins,** field engineer, F. B. Stevens Co. and one member transferred in from the Columbus branch; **John Cram,** sales service, Pennsylvania Salt Mfg. Co.

Bob Ruleff, chairman, Tri-State Regional meeting reported that as a result of a recent committee meeting things are shaping up well for the coming event.

The color film, "Die Casting, How Else Would You Make It" was to be shown but did not arrive. Instead we were shown a movie on "Flight Testing of the F-86."

Librarian **Bennie Cohen** then introduced the speaker, **John A. Swift,** president, Swift Industrial Chemical Co., of Connecticut. Swift gave a very interesting paper "What the Plater Should Know about Metallurgy." He discussed steel making methods, manufacturing operations and types of steel to better acquaint the metal finisher with the metal he is plating, and brought out some of the finishing problems that often arise from the improper selection and processing of steel prior to plating. Many slides illustrating various surfaces and structures were shown. Swift was given a rising vote of thanks for his able presentation.

Refreshments after the meeting were through the courtesy of the F. B. Stevens Co. and their local representative and Dayton branch member, **Harry M. Brown.** 32 members and friends attended this meeting.

R. M. CLINEHENS, Secretary

DETROIT

Another Course; Sylvania's Bandes Talks

The January meeting was held in the Wayne Room of the Statler Hotel on January 6.

A new color movie from the General Motors Corporation, telling the story of the rehabilitation of the American highways, introduced the meeting.

This was a joint meeting and the president, **Lee Morse,** introduced the officers of the Electrochemical Society. Lee then discussed the reasons for the move to the Sheraton Cadillac for the annual Christmas Party. Everyone was advised to make their plans as early as possible.

Ed Kubis announced there would be several people dropped from membership if dues were not paid soon.

Committee chairman, **Wright Wilson,** gave a report on the Christmas Party.

Plans for the course in Electroplating being set up by **Fred Brune** will be discussed in detail at the next month's meeting. Anyone wishing to know more about this course, should be present at the February meeting by 7:30 o'clock.

Bob Racine gave credit to **C. D. Sparling** for his efforts in getting A. T. Wagner Company as a new sustaining member.

Manuel Ben, technical chairman, introduced the speaker of the evening, **Dr. Herbert Bandes,** manager of the Semi-Conductor Development Engineering, Sylvania Electric Products Company. Dr. Bandes' talk was on "The Relation of Recent Studies in the Solid State to Electrodeposition."

The meeting adjourned for refreshments at 9:45 P.M.

PAT DRISCOLL

GRAND RAPIDS

Badaluco Wins a Prize; Kimmel Talks on Mg

Approximately sixty members were present for dinner at

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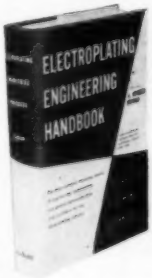

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BRANCH NEWS

Finger's Restaurant at the January 13th meeting of the Grand Rapids branch. The menu included a choice of chicken, fish, shrimp or steak.

Badaluco

President **Perry Burnham** brought the meeting to order with a report on the completed plans for the branch annual banquet and educational session to be held February 11th. Applicants **Kenneth Holmes, Karl Brink** and **Addison Snyder** were accepted as new members.

The Grand Rapids branch paper award of one-hundred dollars was presented to **James Badaluco** of the J. C. Miller Division Hanson-Van Winkle-Munning Corporation for his paper "Tripoli As An Abrasive in the Development of Buffing Compounds" which appeared in the June 1955 issue of PLATING.

The guest speaker for the evening was **C. E. Kimmel** of the technical service and development department of Dow Chemical Company. Kimmel's subject was "Magnesium Finishing" and of particular interest to the membership were the highly informative details of various magnesium alloys and their treatment prior to plating, painting and anodizing. A lively general discussion period followed the talk.

THOMAS C. HENNER, Publicity Chairman

HARTFORD

Dr. Dodd Carr on Ni Plated Steel Sheets

The regular branch meeting was held at the Bond Hotel on Jan. 16th and about 78 members and guests were present. Prior to the meeting a colored movie entitled "The Fabrication of Nickel Plated Steel Sheets into a Tank Car," was shown.

Carr

The guest speaker for the evening was **Dr. Dodd S. Carr,** assistant director electrochemical research, Bart Laboratories Co., Inc., Belleville, N. J.

Dr. Carr described the plating of sheet steel from a Watts nickel bath for protection of corrosion and erosion of steel. The complete cycle of cleaning and pickling the large steel sheets was described and the physical properties of the resulting plated sheet were given.

By means of various slides the fabrication of these steel sheets into tank cars and other items where corrosion resistance is important was shown. The remarkable adherence of the nickel plate was shown as it was formed and welded into various objects.

The technical chairman for the evening was **Ralph McCahan.**

STANLEY PLATOZ, Secretary

INDIANAPOLIS

Tri-State Affairs; Tubby Toms on Stream Pollution; a Visit to Western Electric

Thirty members of the Indianapolis branch attended the January 4th, 1956 meeting at Fox Steak House. Among the guests was **Barkley** of the Kansas City branch. After the usual opening of introductions, reports of secretary and treasurer, the delegates for the year were elected. In a motion by **Harry Smith** and seconded by **Bert Hawhee,** the branch secretary was made a delegate. Others elected were **John Holland** and **John Hood.** Alternates elected were **Quentin Shockley, Ed Bruck** and Bert Hawhee.

Our president, **Herb Kennedy,** presented the by-laws of the Tri-State Region AES and there were several changes to be accepted by our branch. The first one which was put into a motion by **Marshall Whitehurst** and seconded by Shockley that was under

Article I, part 2, "The Tri-State Region is organized for the objects as set forth in the Constitution and by-laws of the American Electroplaters' Society." This was voted on and passed. Under Article V, Duties of Officers, section 3, "Custodian. The custodian shall act as custodian of the general fund and pay all bills as directed by the committee. It is assumed that the host branch, treasurer, for each annual meeting will handle all receipts and disbursements for that meeting. He will submit a final financial report to the permanent Tri-State committee." This was put to a vote in a motion by Smith and seconded by **Bill Niehaus** and passed. Under Article VI, section 1, Funds—"It is the policy of the Tri-State Region that annual meetings shall be self-supporting. The minimum fund limit shall be $1000.00 and the maximum limit $1500.00. Any deficit from a given year shall be made up from this fund. The first $250.00 profit from any given year shall be retained by the host branch. All profits over $250.00 in any given year shall accrue to the general fund. If the general fund exceeds $1500.00 the excess shall be equally distributed to the member branches. It is understood that funds derived from donations shall not be distributed to member branches. In the event that the general fund goes below $1000.00 the Tri-State permanent committee will determine the measures for financial adjustment." This was accepted in a motion made by Bruck and seconded by Shockley and passed. Under the same Article section 3 "In the event that the Tri-State Region shall be dissolved as an active organization, all funds of the Region shall be divided equally among the member branches." This was accepted in a motion by Shockley and seconded by Niehaus and passed.

Reports were given on our annual yearly meeting of April 28th. It was moved by **Elmer Lundberg** and seconded by **Al Kriese** that we have a smorgasboard at this meeting. The motion was passed. In a motion by Kriese and seconded by **Roman Bender,** it was decided to have favors for the ladies. This motion was passed. **Lowell Fisher** is in charge of hotel reservations and rooms. **Les Reynolds** is in charge of tickets and they will be on sale the last of February.

The next Tri-State meeting was announced and this will be on March 10th at Biltmore Hotel at Dayton, Ohio.

The committee on our paper "Filter Media" is working and they are Marshal Whitehurst, John Hood, Elmer Lundberg, and Quentin Shockley. Any suggestions or help will be welcomed.

One transfer of membership was accepted and this was for **David Sivertsen,** from the Newark branch. This was moved by Hawhee and seconded by Bender and passed.

Our president appointed Ed Bruck as branch historian to write up the complete history of our branch and send it into the Newark office by April 1st.

People who have been reading "Outdoors In Indiana" in the Indianapolis newspapers for many years had the pleasure of seeing and hearing **William (Tubby) Toms** in person at this meeting. Toms was a combination humorist and conservationist. His subject was on stream pollution and how it affects wildlife in Indiana. He cited many instances of various type of pollution, not only from plating installations but from canning factories, paper mills, and those who use cyanide in treatment of metal. Human error is the cause of the many known times that state streams have been polluted. This has been going on for many years but it has been of very recent years that something is being done about it. Toms is a crusader in this field and is very sincere in his efforts. He concluded his talk with a serious moment when he stated that he honestly believed the whole thing will be straightened up in our state and elsewhere.

The meeting adjourned at 9:30 P.M.

Ladies' Nite and Guest Nite was in order for the February 1st, 1956 meeting of the Indianapolis branch. One hundred ten persons attended at the Western Electric Company plant in Indianapolis for dinner and a tour. A very delicious fried chicken dinner was served to us as guests of the Western Electric Company. Regular business was dispensed of except for a few

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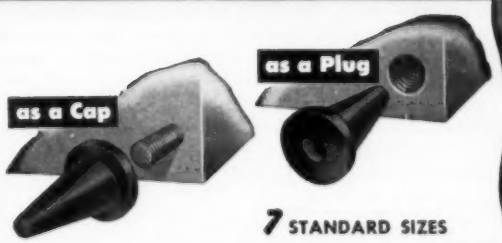

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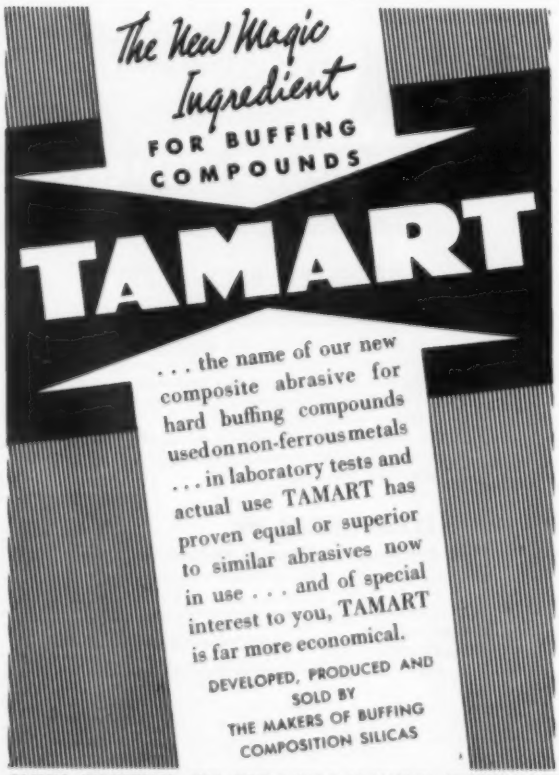
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announcements which were the reminder of the Tri-State meeting on March 10th in Dayton and our own annual meeting of April 28th at the Indianapolis Athletic Club.

The group broke up into small numbers of six or eight and with guides set out to see this huge plant, the maker of the telephone. This plant employs about eight thousand persons, of which twenty-one hundred were on duty at the time of the tour. Every part of the telephone is made here and this means all types of telephones such as those for army, navy, air-force telephones, field phones, fire alarm telephones, the standard telephone and many others. Color is an important feature of the home phone so we saw those blues, greens, red, grays, whites, yellows and of course black. The machines which operate making the various parts were fascinating to all, especially the one that very adeptly ties a string around the wire for the telephone. This attracted many. Also, the conveyor that separated the various colors after they were boxed, this was a mystery to all. Since the manufacturing of phones is light work, women were prominent in this plant.

We saw the molding of various type plastics and also the making of die castings. There were many huge plating installations which was of natural interest to all of us. Gold plating is done in a separate room and the volume of this is rather great. Certain parts are gold plated to resist any kind of corrosion or tarnish. We learned of the making of the parts that reflect the voice in the telephone. The technical angle was not too clear to most of us but nevertheless, we know that the telephone, an instrument which most of us take as an everyday important gadget, is a very intricate machine and requires many persons' work and time.

The branch certainly owes the Western Electric Company a vote of thanks for their generous hospitality for a very enjoyable and enlightening evening.

EDNA ROHRABAUGH, Secretary

LOUISVILLE

R. T. Gore on Zn-Sn Alloys

The regular monthly meeting of the Louisville branch AES was held Thursday November 17, 1955, at Kapfhammers Party House, 1506 South Shelby Street, Louisville, with a dinner served at 6:30 P.M. 1st vice-president, **Ken C. Reifsteck** opened the business and open meeting at 8:30 P.M. with 18 members and guests present.

James R. Smith, delegate to the Tri-State Regional meeting, submitted a revised by-laws of the Tri-State Region to our members. After some discussion, a motion was made by **James R. Smith** and seconded by **Harold Peters** to adopt these by-laws. The motion was carried.

The membership committee reported one application for membership.

The publicity committee reported that progress is being maintained.

The technical sessions chairman, **J. S. Houston,** announced that there will be no meetings held in December due to the Christmas Holidays.

Application for membership: **H. D. Bowsher,** Fern Creek, Ky.; **R. D. Wallin,** Fern Creek, Ky.; **F. E. Wilcher, Jr.,** Louisville, Ky.

Vice-president, **K. C. Reifsteck,** presented a past president emblem to past president, **John W. Scholl.**

Our membership status at the present time is 44 members. We expect to increase our membership this year through our officers and members who insist on having good programs and interesting speakers.

The meeting was turned over to the technical sessions chairman,

J. S. Houston who introduced the speaker **Robert T. Gore** of the Metal & Thermit Corporation, Rahway, N. J. Gore, in his talk on Tin Zinc Alloy, gave us some very interesting information on the following plating baths: tin zinc, tin lead, tin cadmium, tin nickel, tin bronze.

The corrosion resistance of these baths was placed as excellent, using a comparison between copper nickel chrome to tin nickel alloy.

Considerable discussion followed and Gore was given a rising vote of thanks for a very interesting talk.

J. G. Sterling, Secretary-Treasurer

LOS ANGELES

Electroforming and Ultrasonic Cleaning

The regular monthly meeting of the Los Angeles branch was held at the Rodger Young auditorium Wednesday night Jan. 11 with 90 members and guests in attendance. After the dinner was served president **Arnold** called the meeting to order at 8:20 P.M.

Sergeant-at-arms **Pete Esten** introduced the visitors and the secretary-treasurer's report was read and approved. The membership chairman vice-president **Truman Stoner** then reminded everyone of the contest that is being held to acquire new members into the branch.

The regular order of business was then dispensed with and the meeting turned over to librarian **Norm McEwan** who had three speakers for the evening: **Paul Silverstone** on Electroforming and **Bill Castell** and **Frank Shag** on Sonic Cleaning. After a lively discussion period the meeting was adjourned at 10:00 P.M.

George J. Hetz, Secretary

LOS ANGELES ANNUAL MEETING, MARCH 17

St. Patrick's Day, March 17, will feature the annual technical session and dinner-dance by the Los Angeles branch at the Hotel Statler. This announcement was made by branch secretary **George J. Hetz** who promises education and fun to all who attend. For tickets and information, telephone TRinity 6894 or write to Mr. Hetz at 1026 Santa Fe Avenue, Los Angeles 21, Calif.

MILWAUKEE

In December, Paints and Lacquer; In January, More Ni Shortage

The December meeting was gavalled to order by president **H. Tessman** with forty people present. The minutes and financial report for both the October and November meetings were accepted as presented by the secretary. The membership accepted two applicants as new members and they are: **Robert Strommen, Jr.** and **Thomas McCullough.**

Correspondence from the St. Joe Valley branch, regarding their candidate **Duke Wysong,** was read.

During the new problem period one of the members obtained useful information from those present regarding the temperature-time relationship for the hydrogen embrittlement relief of zinc plated spring washers.

Librarian **J. Severson** introduced **Philip Weigand** and **Dr. John Jenkins** of Pittsburgh Plate Glass Co. They spoke on enamels and lacquer, respectively. Quite a spirited and lengthy discussion period was enjoyed by the members. The meeting

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BRANCH NEWS

was adjourned and then refreshments were served through the courtesy of the Pittsburgh Plate Glass Co.

The first meeting of the new year was called to order by the president at the Ambassador Hotel with forty-five members in attendance.

Correspondence from the National office was read regarding the request for a history of the branch, and a branch historian will be appointed to fulfill this. The secretary also read a letter requesting the members to consider the writing of articles for PLATING. A nomination committee will be appointed at the next board of managers meeting.

In the general discussion period it was noted that the nickel shortage was more critical now than in previous months. A question about the bagging of anodes of a cyanide zinc solution introduced quite a bit of discussion from those present.

The meeting was turned over to the librarian who introduced **John Sargent** of the MMM Co. Sargent spoke on the use of fluorochemicals in the metal finishing industry. The speaker had various slides to illustrate the many properties of these fluorochemicals. After a short discussion period the meeting was adjourned.

C. PETER, Secretary

MISSISSIPPI VALLEY

Two Talks and an Active Branch

The Mississippi Valley branch of the AES held their January 1956 meeting at the Tower Restaurant in Moline, Ill., on the 11th. It was preceded by a dinner in the meeting room.

The meeting was called to order at 8 P.M. by **L. O. Gilbert,** president. The chair introduced **Carrol Pickering** of Hanson-VanWinkle-Munning Co. who talked on "Full Automatic Plating" and showed slides and movies of the automatic equipment at National Lock Co. in Rockford.

Pickering's talk was followed by one by **Don Morris** whose subject was "Air Agitation of Plating Solutions." A lively question period followed. Lloyd Gilbert thanked the speakers.

A discussion followed about potential speakers. The suggestion was offered that the meeting might be changed to the second Wednesday so our meetings will closely follow those of the Rockford branch. This would make it possible to have the same speaker as Rockford, if desired.

The chair stated that a nominating committee will be appointed soon for the selection of officers for the coming year.

The meeting adjourned at 10:20 P.M.

One of our charter members, **Floyd Darrell Goar,** is now serving his tour of duty in the Army. Darrell is connected with the metal finishing section of the laboratory at Rock Island Arsenal. His address is U.S. 55562170, Btry "D," 231 AFA Bn, 2nd Plt., Fort Lenordwood, Missouri.

Lloyd O. Gilbert and Mr. & Mrs. **Joe McConaughey** attended the Chicago meeting on 28 January. They report it was a very fine get-together.

PAUL CHAMBERLAIN, Secretary-Treasurer

NEWARK

Annual Meeting; Christmas Party; Education; Diplomas; Dancing; Food

The annual meeting and Christmas party were held at the Robert Treat Hotel on December 16th and 17th, respectively. President **Austin** called the meeting to order for a short business session at which time **Anthony Cascella** and **Herman Koretzky** were elected to membership. Secretary **Foulke** reported 26 members suspended prior to December 15th and treasurer **George Wagner** reported out-go exceeding income for November. **Cliff Struyk** and **Lou Donroe** reported all in readiness for the banquet and urged a good attendance. Tom Austin appointed a committee of three, **John Banta, Mel Teets** and **Carl Dowling**

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Bowerman

Carr

Kosmos

to assemble a list of plating shops for the AES and PLATING and announced Foulke, Struyk and **Carr** as Newark branch representatives to the technical societies council. The seventy-odd members and guests, including past-president **George Swift,** AES secretary **Peter Kovatis** and PLATING editor **Arch Doria** directed their attention to two talks, one by **John Kosmos** on "Conversion Coatings" and the second by **Edwin Bowerman** on "Plated Wiring."

John Kosmos reviewed the uses and applications of various conversion coatings, documenting his talk with many colored slides and examples. Ed Bowerman in the new look discussed the various methods employed for making printed circuits and the wide use of the new tool. This talk too was documented with slides and examples.

At the conclusion of the educational session Dodd Carr, assisted by **Gustave Bittrich** presented framed certificates to 30 graduates of Newark branch's electroplating school present out of a total of 38 persons completing the work.

The meeting concluded with all enjoying an hour of friendship, food and beer.

On Saturday night 271 members and guests of the Newark branch attended the 42nd annual banquet at the Robert Treat, enjoying a good floor show, dancing and all that goes with such an affair. Door prizes were won by **Mrs. Marian Bulman, Mrs. Florence Kearns** and **Mrs. Helen Lux,** consisting of a fifty-dollar and two, twenty-five dollar U.S. Savings Bonds, respectively.

D. GARDNER FOULKE, Secretary

NEW HAVEN

Get Yer Tickets for the Annual N. E. Regional Early!

A regular meeting was held on Jan. 10, 1956, at the Mason Laboratory, Yale University.

President **William K. Murray** opened the meeting with the roll call of officers. Approximately 40 members and guests were present.

A report on the past Christmas party showed that the affair cost us just $24.00. Considering the good time that was had and the favorable reaction of the ladies to their gifts, it was a highly successful affair.

The Regional committee gave a very satisfactory report on progress to date. The educational, entertainment and ladies program (including gifts and prizes) all sound promising. It is urged that all members make an effort to get to the 17th annual New England Regional meeting to be held on Saturday, April 7, 1956, at the Hotel Statler, Hartford, Conn. Your branch secretary has tickets at $6.00 each and urges your early reservations.

The following new applications for membership were read and accepted: **F. A. Fox, W. Lawlor, A. Ribas,** and **J. Chordis.** We welcome these new members into active membership.

Ed Foley gave a report on the electroplaters' course being given in New Haven Teachers College. Applications are now being accepted for the new session starting in February and running for 15 Monday evenings. Tuition is $42.00 for the session.

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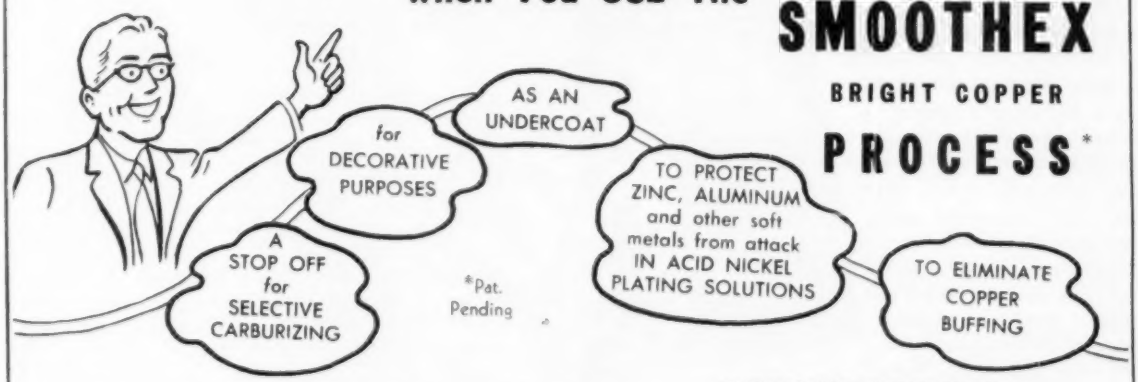
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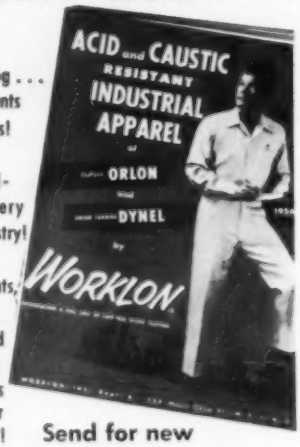

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BRANCH NEWS

Technical chairman **Fred Allen** then introduced the speaker of the evening, **Gerald A. Lux,** technical director, Oakite Products, New York. His subject "Some Fundamentals of Alkaline Cleaning" was one of the best presented in many years. He interestingly discussed the factors in selecting a cleaner, the requirements and factors influencing their application and dramatized his technical discussion with well-timed chemical demonstrations. His listeners were literally conducted on a cleaner development tour and manifested a keen interest during the entire talk. The question and answer period that followed and the rising vote of thanks accorded the speaker attested to the success of the talk.

The door prize was donated by Oakite Products.

B. J. GAFFNEY, Secretary

American Electroplaters' Society
17th Annual New England Regional Meeting
April 7, 1956, Hotel Statler, Hartford, Conn.

The seventeenth annual New England Reginal Meeting of the American Electroplaters' Society will be held on Saturday, April 7 at the Hotel Statler in Hartford Connecticut, with the New Haven branch acting as host. This year five branches will participate to make this regional meeting a Five Star affair, according to William K. Murray, General Chairman.

Robert J. Girard, Springfield Branch, chairman of the educational program has announced the following program of speakers:—

1. "Barrel Burnishing" by Arthur S. Kohler, Frederick Gumm Chemical Co. Inc., Kearny, N. J.
2. "Textiles for Buffing" by William Phillips, Deering Milliken Co.
3. "High Speed Bright Plating of Brass, Copper and Nickel in Barrels" by Barnet D. Ostrow, Lea-Ronal Inc., Jamaica, N. Y.

Concurrent with the educational session which will start at 2 P.M., there will be a special Ladies' Program consisting of Entertainment and Bingo games with prizes under the able direction of Julie P. Madzik, Hartford Branch. After the educational session and Ladies' Program, there will be the usual Dinner Dance starting at 6:30 P.M. in the Capitol Ballroom. Joseph McInerney of the Hartford Branch, has arranged an excellent entertainment program. Music will be supplied by William Glenny's orchestra as of last year.

Tickets for this FIVE STAR REGIONAL may be obtained at $6.00 per person from the secretaries of any of the following five branches: Waterbury, New Haven, Bridgeport, Springfield or Hartford.

NEW YORK

Perez on Rack Coating and "Nickel Night"

Held January 13th, 1956 at the Hotel Statler, New York. The meeting was called to order by **A. Fusco,** president. The roll of officers was called and all were noted present. The following applications were presented for membership into the society: Messrs **Fowler, Henring, Hewes, Hotten, Proli, Pepe, Ader, Bovell, Wexler, Campanella, Corrona, Ruddey.**

Messrs **LeFevee, Maymont, Brooks** and **Capozzi** were accepted and duly sworn in as members of the New York branch.

There being no other business to be acted on Fusco turned the

chair over to **E. Saubestre,** librarian, who in turn presented **M. Perez,** of the coatings department of United Chromium Div. Perez addressed the branch on "Rack Coatings and Stop Offs."

First Perez discussed some of the chemical and electrical resistant properties which rack coatings must possess to be of practical interest. He then briefly discussed the various types of coatings, namely; tapes or rubbers, waxes and other hot dips, stop-off lacquers, and plastisols. Method of application and the removal of the temporary coatings such as waxes and other hot dips and stop-off lacquers were first discussed. The main part of the talk dealt with the use of plastisol coatings. The main ingredient of these materials is a plasticizer which must be resistant to oxidation to such materials as chromic acid and to hydrolysis by acids and alkalis. A properly formulated plastisol will not oxidize until heated. On heating, the resin dissolves to form a gel; in other words, the two phase system is converted to a one phase system. This occurs around 350–360° F. On cooling, the gel solidifies to give a firm rack coating. The hot dip method is commonly used to apply the rack coating. In this method, the rack (*not* the plastisol) is pre-heated. On dipping, a gel up to ¼ inch thick forms on the rack and the excess drains off. Dipping is followed by baking. For maximum adhesion to metal a primer must first be applied.

Pierdon

The talk was well received by the 55 members present and a lively question period ensued. At the close of the meeting, **Art Pierdon** of Baltimore-Washington branch discussed briefly the forthcoming convention. **Ralph Schaefer,** past-president of the National Society was introduced to the members.

LESTER LEVINSON

January 27 was "Nickel Night" in New York. The technical program opened with the showing of a new 45 minute color and sound movie on "Mining for Nickel." The film showed how future mines are discovered by exploration teams and how mapping of the ore body is done. The rest of the film then described in detail how underground and open cut mining is carried out in Canada. The film closed with a cartoon showing a revolutionary new way of extracting low grade nickel ore from previously played out open cut mines.

Walter Prine of International Nickel was next presented as our first speaker. He discussed "The Nickel Situation in 1956." By means of slides, he presented many charts showing nickel consumption by various industries in the past few years, and projected this information through 1956 and early 1957. Present allocation policies were reviewed, with particular reference to how the cutback in the steel industry in 1954 and the possible cut-back in the automotive industry in 1956 affect supplies of nickel for the electroplater. The question of premium nickel was discussed at length and a historical review was made of how such foreign nickel is priced and what its outlook is for 1956–57. The purpose and effect of heavy diversions from stockpile in 1956 was also mentioned. There was a lively discussion period after the talk, particularly concerning allocation policies between various nickel consuming industries and use of premium nickel. in 1956 was also mentioned. There was a lively discussion period after the talk, particularly concerning allocation policies between various nickel consuming industries and use of premium nickel.

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ALBERT HIRSCH

Albert Hirsch, honorary member of the Supreme Society since 1947 and Philadelphia Branch member since 1924 died suddenly on Thursday, February 9. Funeral services were held on February 13.

Albert Hirsch was born in Philadelphia on May 1, 1883. He studied at night at Drexel Institute to improve his knowledge of chemistry. His first plating job was with Carey-McFall Company in 1904 where he became foreman plater in 1950. He wrote many papers on basic plating problems and thereby gained a national reputation. He was Librarian of Philadelphia Branch for many years. He was extremely interested in establishing electroplating sections in libraries and was instrumental in donating complete sets of AES Proceedings and Monthly Review to the Free Library of Philadelphia, together with many books on electroplating.

He organized and taught electroplating classes at Mastbaum Vocational School until his retirement a few years ago. A close friend of the late George Gehling, he sponsored the annual George Gehling memorial lecture by the Philadelphia Branch after Gehling's death in 1948. He was always interested in the problems of the practical plater and gave unsparingly of his immense store of knowledge to all who sought his aid.

His interest in AES never ceased after his retirement from active work. Present at all meetings that his health would permit him to attend, he took an active part in the proceedings. Although he had but recently recovered from a serious illness, he attended the 1955 Cleveland Convention so as to be abreast of the latest in his beloved field. To the very last his thoughts were with his fellow platers. Realizing he would not recover from the heart attack which he suffered in the night, he told his family that they must notify the Society as soon as the end would come. He wanted his plater friends to know that he had not forgotten them.

He is survived by a son, Edward; a daughter, Sister Luciano in IHM Order; a daughter, Mrs. Anna Harley and three grandchildren.

BRANCH NEWS

Our final speaker of the evening was **Dr. Clarence Sample** of International Nickel who rounded out "Nickel Night" by speaking on "ASTM Activities in Corrosion of Cu-Ni-Cr." He discussed at length ASTM's exposure program at Kure Beach on the copper-nickel-chrome system. Exposures of over three years duration have shed light on the effects of total plate thickness, relative thickness of copper vs. nickel, buffing and use of a copper strike. One of the outstanding conclusions of this study was that very superior results could be obtained by plating half the desired nickel thickness from a Watts bath, buffing, heat treating, then plating the remaining half of the total nickel coat. Another important conclusion was that for a given thickness of Cu plus Ni, increasing the relative amount of copper was very deleterious. A good discussion period followed in which questions were asked concerning automotive applications, bright nickel, bronze vs. copper and Battelle's new copper-tin process. The meeting was adjourned with a rising vote of thanks for both speakers by the 65 members and guests present.

Sample

EDWARD B. SAUBESTRE

PHILADELPHIA

A Lively Branch Has a Well-Attended Meeting

The regular meeting at the Engineers Club on January 23 was very well attended: sixty at dinner and about ninety for the meeting. Branch president **Trusdell** on opening the meeting at 7:55 commented on the large attendance in view of return cards received for thirty-two by January 21. Eighteen guests were introduced by vice-president **Farren.** The minutes of the previous meeting were read and approved. The treasurer, **Paul Mentzer, Sr.,** gave his report and included preliminary returns of the 1955 banquet. The various chairmen of the banquet committees gave their final reports and the committees were discharged by Trusdell with thanks. The appointment of **Elmer J. McCarthy** to the welfare committee was announced.

Heiman

James Cogan reported that a firm commitment from the Benjamin Franklin Hotel reserving October 20, 1956 for the 1956 banquet and educational session had been received. By a motion the branch accepted the hotel and date. The secretary read communications. Trusdell announced the nominating committee for the 1956–57 term: **Nat. Verrelle,** chairman, **C. Boerekel** and **A. Wanamaker. Edwin Ottens** read the report of the

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vice-chairman, research, of December 2, 1955. Two applications for membership were referred to the board of managers. **Dr. S. Heiman,** AES first vice-president, gave a report of the executive board meeting of January 14 and 15.

The speaker was **Dr. Samuel Spring,** Pennsalt Co., who discussed metal cleaning and phosphating of metals. In describing the basic principles of detergency, Dr. Spring showed with the aid of slides the gradual shrinking of oily globules until they are removed by difference in specific gravity; the importance of agitation to this mechanism. He gave data on the influence of soils, such as palm oil, mineral oil and drawing compounds on the selection of electrocleaners. The major portion of Dr. Spring's presentation was answering questions following his rather brief formal talk. The questions covered every phase of cleaning and were deftly handled by Dr. Spring.

The meeting adjourned at 10 o'clock.

I. Wm. Marcovitch, Secretary

PITTSBURGH

No Free Dinner

The January meeting was featured by a talk and movie presented by **Frank Lisowski** of Wagner Brothers who had selected as his subject "Automatic Plating Equipment and Processes." Frank's coverage of automatic plating machine was very complete. Starting with the essential points to be considered before designing any equipment, he compared all the various features and factors that must be evaluated from a mechanical, contaminating, maintenance and plating viewpoint in selecting a type of unit to build, either an intermittent or cam rail system.

At the short business meeting which preceded the talk three new applicants were voted into the branch: **John Mechtly, Edwin Sokalski** and **Robert Hartung. Myron Ceresa** reported for the ladies' night banquet committee that they had tentatively selected the second Saturday after Easter for the date and the Gateway Plaza as the location.

After the usual beer break the speaker drew the slip for the door prize winner. **R. E. Woehrle** won a lovely wall barometer presented by **Bud Weiss** of United Chromium Inc. No free dinners were given away this month since the two members whose names were picked were not at the dinner phase of the meeting.

Herb Schram, Secretary

PROVIDENCE-ATTLEBORO

Christ on Samples

The regular monthly meeting of the Providence-Attleboro branch was held Jan. 16, 1956 at the Providence Engineering Society building at Angell St., Providence.

President **P. Lonsbury** called the meeting to order at 8:10 P.M. In furthering a program to preserve the history of the branch, **Arthur Wood,** one of our oldest active members, was appointed historian. He will be assisted by **James Potter** and **Dr. E. Parker.**

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BRANCH NEWS

Tom Barron was called upon to greet his many friends. A guest for the evening was **E. Lyons. William E. Collins,** our newest member, was also present.

The speaker for the evening, **Edward H. Christ,** was introduced by Lonsbury. Christ's background included work with many of the foremost plating and finishing houses. He is now president of The Chemical Coatings Corporation.

The subject of Christ's talk was: "Samples of Organic Finishing Materials and their Evaluation." Some of the salient points brought out were: (1) the high cost of producing samples, (2) necessity of getting the correct information, (3) desirability of setting up test specifications prior to testing, (4) advantages gained in following through on results obtained from various samples, (5) using samples under conditions such as the supplier specifies.

The meeting adjourned at 9:20 P.M. after a question and answer period with a rising vote of thanks to Ed Christ.

F. L. SHERMAN, Secretary

ROCHESTER

Vanden Berg Speaks Informally on Al_2

The Rochester branch met for their monthly meeting at the 40 & 8 Club on January 16, 1956.

An invitation was read from the Buffalo branch to attend the regional meeting to be held in Buffalo on April 14, 1956.

The Christmas party for 1956 has been tentatively announced for December 8, 1956.

The May meeting will again be held at the Standard Brewing Company, 436 Lake Avenue, Rochester. It will consist of a buffet supper, a short business meeting primarily for the election of branch officers, and entertainment.

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After the business meeting, **R. Vanden Berg** spoke very informatively on Electroplating and Anodizing of Aluminum Alloys. Slides supplemented his talk. Vanden Berg has been with Alcoa since finishing school, in the field of process plant metallurgy. He is at present department head of the finishing division of the process development division.

Upon conclusion of the speech and a short discussion, refreshments were served.

FREDERICK L. JOHNSON, Secretary

SAN FRANCISCO

Big Annual Party for Christmas

In place of a regular monthly meeting, the San Francisco branch held its annual Christmas party on Monday, December 19, 1955. The party was held at Bimbo's 365 Club, 1025 Columbus Avenue, San Francisco.

S. F. Members Frolic—and Eat, and Drink

The Christmas party committee had gone all out to make this party a bang-up affair. The menu consisted of a full course steak dinner, complete with wine.

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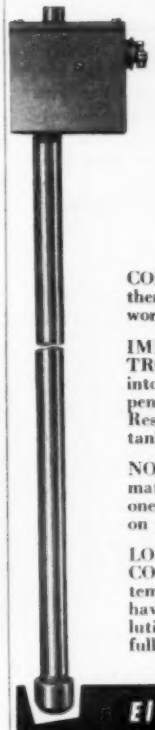

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BRANCH NEWS

After dinner, tickets were drawn for door prizes. These prizes had been donated by the supply houses and interested parties throughout the area. Many couples took home lovely prizes.

The floor show was enjoyed by all and after the floor show all the couples enjoyed an evening of dancing.

B. I. Trygstad, Secretary

SOUTHERN TIER

First Annual Christmas Party a Success

The first meeting of the new year was successfully opened at the Iron Kettle Inn, Waverly, N. Y. Pres. **Rood** opened this meeting for the Southern Tier branch on January 17, 1956. **C. Bounds** reported on a most successful Christmas party. It was our first annual Christmas party and a large majority of the members and wives attended to make it a most memorable occasion.

C. Harris noted the fact that there are four or five new prospects who are interested in joining our society. Our April meeting was discussed and a plant tour of I.B.M. is scheduled. **S. Stefanski** then introduced the guest speakers, **R. Hale** and **L. Mensenti** of J. J. Seifen Co. They demonstrated the methods and applications of the spraying of buffing compounds. This was a very interesting and informative demonstration. Meeting adjourned at 10:30 P.M.

Roger W. Wheeler, Secretary

SPRINGFIELD

The Best Yet

Richard C. Barrett of Barrett Chemical Co., Shelton, Conn. was the guest speaker at January 23 meeting of the Springfield branch. Although there were only 23 members and guests present to hear Barrett discourse on the Nickel Sulfamate Plating Process, everyone (but everyone!) agreed that the technical session, speaker and subject, was the best that Springfield has listened to for quite a long while.

Delegates to the National Convention at Washington were elected as follows: **Edward Mahar, Edward F. Koetsch, Jr.,** and **Henry L. Heissfeld.** Alternates are: **Philip Prouty, Edward Dupuis,** and **Walter Dyber.**

For February, Springfield will have a speaker who will delve into some of the mysteries of what goes on in a plating bath. This should arouse quite a bit of interest as the subject is a many time request.

Henry L. Heissfeld, Secretary

ST. JOSEPH VALLEY

3M's Miller on PC Wheels

The January 4th meeting of the branch was held at the LH Inn in Mishawaka. Fifty-six members and guests attended the dinner and technical session.

The minutes of the December meeting were read and approved. The application of **M. Becknell** was read and accepted.

During the question and answer period the following questions were discussed:

1. Are plating solutions considered in figuring inventory for tax purposes?

2. Is it desirable to adjust the volume of a chromium solution to compensate for heat input from current in order to eliminate cooling coils?

Answer to number 1 was that it depends upon individual companies' policy. No. 2—If such an arrangement can be operated consistently at full load or a relatively constant total amperage it might be feasible. If load is variable, the amperage may not hold temperature constant.

Some discussion followed on the appointment of a historian

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for the branch to collect information for the National office. There were no volunteers and it was pointed out that some of the early records are still in the possession of **Geo. Bock, Jr.** the first Secretary of our branch.

Control of the meeting was then given to **Ray Dearth,** our librarian, who introduced **D. E. Miller,** of the Minnesota Mining and Mfg. Co. Miller's subject was "Coated Abrasives to Prepare Metals for Plating." He pointed out that every individual polishing operation should be studied and that many variations in techniques are possible. For this reason it was only possible to discuss general applications. Scalloped belts are a recent development for getting into contours. Cork imbedded polishing belts may be used for removing the frost from glass.

The latest development is the PG wheel which gives a uniform RMS finish from the first piece to the last. It is made up of a series of abrasive coated cloth pieces placed around a center core. This method of mounting continuously presents a fresh surface.

A film entitled "Production for Finish" was run. It depicted a number of applications of abrasive belts and wheels. Several polishing and finishing operations may be accomplished on one wide belt by using different areas. Miller then answered numerous questions from the floor pertaining to the subject.

H. J. WIESNER, Secretary-Treasurer

ST. LOUIS

A New School; Pinner on Corrosion Tests

The regular monthly meeting was held Wednesday January 11th at the York Hotel. Thirty members and guests were present for dinner. The business meeting was called to order by president **Hunleth** and thirty-six members and guests stood and introduced themselves. The minutes of the previous meetings were read and approved.

New members elected: **William Sullivan**, Chrome Craft Corp.; **Arthur Hunning,** Chrome Craft Corp.; **Edgar Mauer,** Chrome Craft Corp.; **Joe Beane,** A. B. Chance Co.; **William Aves,** Wagner Electric Corp.

Ed Sertl reported for the school committee. He gave details of the meeting held with Hadley Technical High School officials as well as outlining the work remaining to be accomplished in order to start the school in September.

Prior to the introduction of the speaker **Arthur Wrisberg,** vice chairman National Research Committee, read a list of the sustaining members in the St. Louis area who support the AES research program.

Dick Nyquist introduced **Walter Pinner,** executive staff engineer of Houdaille Industries Inc. and chairman of AES Research Project No. 15. His talk covered the work to date on a new corrosion test to replace the unreproducible salt spray test.

Some of the tests that show promise are as follows: 1. Acetic acid modification of salt spray test, 2. Electrolytic corrosion test, 3. Road slush splash test followed by humidity cabinet, 4. Applying synthetic soil to surface by rubbing followed by dry humidity exposure.

The meeting was adjourned after a lively question period.

Francis Feeherty who recently underwent a serious operation has been released from the hospital to his home, but will be unable to go back to work for 3 or 4 months.

WARD W. KELLY, Secretary-Treasurer

WICHITA

An Educative Session

A regular meeting was held January 25th at the El Charro Cafe with 15 attending. The business meeting was called to order by president **Ogle French,** and business conducted as usual.

The Wichita branch was honored by three visitors, **Ralph Humphreys, A. C. Hunsaker,** and **C. Lydick.**

Ogle French announced that our February regular meeting would be a dinner at the Cessna Aircraft Company and a tour of the plant.

In lieu of a guest speaker, the Wichita branch held a panel discussion with **Bob Samuelson, Dick Balbierz,** and **Gene Roark** acting as a panel with Ogle French as moderator. The questions and problems submitted to the panel for discussion and their opinion were (1) What causes, and how can it be eliminated, the white powder formed after anodizing, alodining, and iriditing aluminum? (2) What is the relation between pH and chloride in Dow 7 solution? (3) When heat treating of 2024SO Aluminum sheet, how long should you wait before you age the metal? (4) When there has been a delayed quench on aluminum, can you reheat treat to eliminate the ingranular corrosion susceptibility? Part 2: How do you know when you have a delayed quench which causes susceptibility to corrosion which is beyond the allowable limit? (5) Lydick presented two species of antique cabinet hardware and asked why the two should differ and how he can accomplish a uniform color.

F. B. SWIFT, Secretary

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WESTERN ONTARIO meets third Friday of each month at the William Pitt Hotel, Chatham, Ontario at 7 P.M. Secretary-treasurer, Dave Mainland, 21 Maple Street, Chatham, Ontario. Research finance committee chairman, Paul B. Croly, *c/o* Ontario Steel Products, Ltd., Chatham, Ontario.

DAYTON meets third Wednesday of each month in the Biltmore. Secretary, Richard M. Clinchens, 3206 Harwood St., Dayton 10, Ohio. Research finance committee chairman to be appointed.

FUTURE MEETINGS

INTERSOCIETY

March 12-16—NACE Annual Conference and Exhibition, Hotel Statler, N. Y.

March 14-16—ASME Aviation Division Conference, Los Angeles, Calif.

March 19-23—ASTE Industrial Exposition & 24th Annual Meeting, International Amphitheatre, Chicago, Ill.

March 18-20—Steel Founders' Society of America, Annual Meeting, Chicago.

March 26-27—ASME Instruments and Regulators Division Conference, Princeton, N. J.

AES

March 9—AES Research Committee Meeting, Hotel Biltmore, Dayton, Ohio.

March 10—Third Annual Tri-State Regional Meeting, AES, Hotel Statler, Buffalo, N. Y.

March 17—Annual Technical Session and Dinner-Dance, Los Angeles Branch at the Hotel Statler, Los Angeles, Calif.

April 7—New England Regional Meeting, AES, Hotel Statler, Hartford, Conn.

April 14—Second Annual Empire State Regional Meeting, AES, Hotel Statler, Buffalo, N. Y.

April 14—Annual Educational Session and Banquet. Rockford Branch, AES, Faust Hotel.

April 20—Editorial Board meeting, 10 A.M., National Headquarters.

May 5—Annual Regional Meeting, Toronto Branch, AES, Sheraton-Brock Hotel, Niagara Falls, Ontario, Canada.

May 5—20th Annual Banquet and Technical Session, Boston Branch, Hotel Statler, Boston, Mass.

June 17-21—43rd Annual Convention of the AES, Hotel Statler, Washington, D. C.

June 17-20, 1957—44th Annual Convention of the AES, Sheridan-Mt. Royal Hotel, Montreal, Canada.

May 19-22, 1958—45th Annual Convention of the AES, Sheraton-Gibson Hotel, Cincinnati, Ohio.

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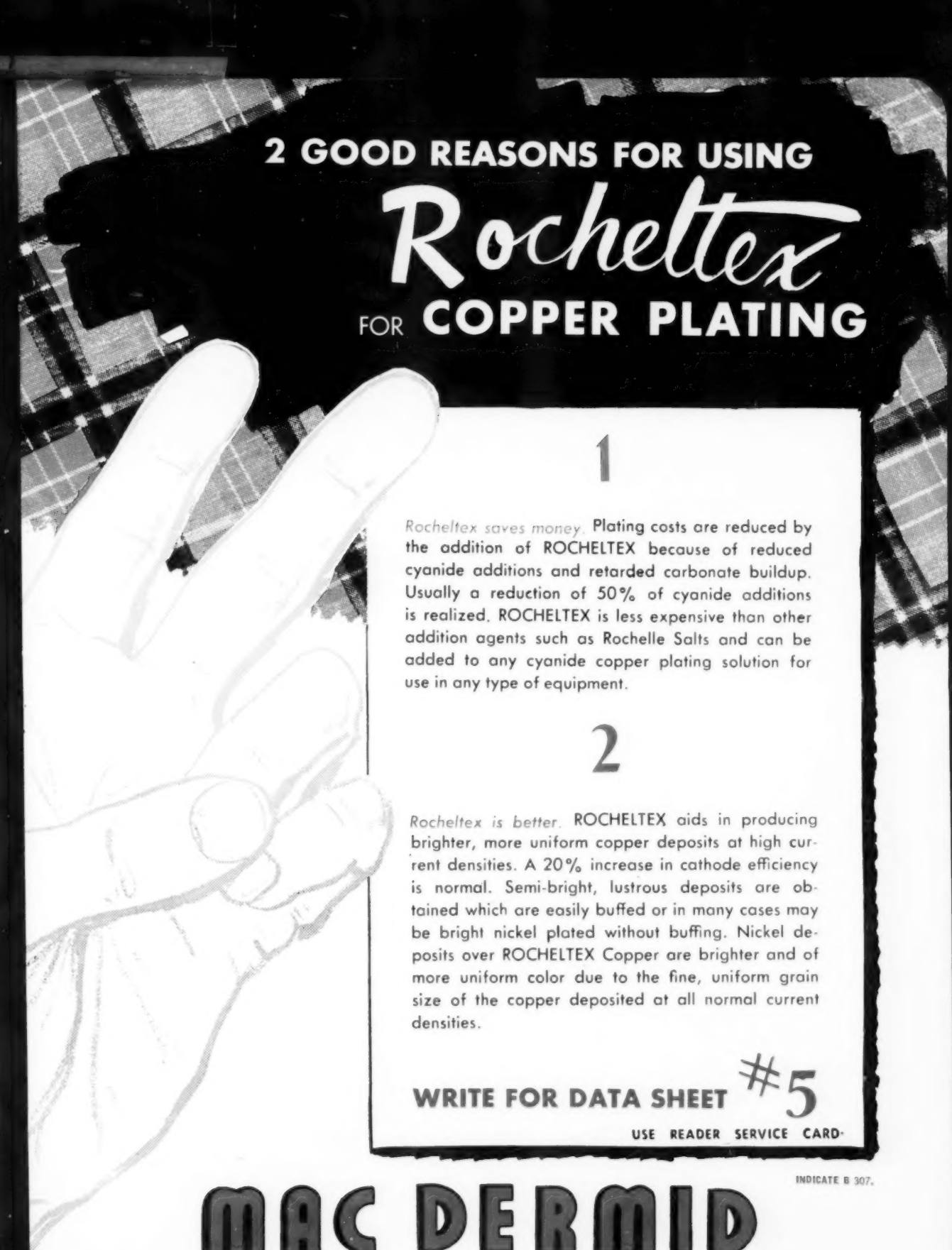

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